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ABBREVIATIONS

In the names of journals cited in references and bibliographies, prepositions and conjunctions have been generally avoided, and the following abbreviations used :

Abnorm.	Abnormal	*Med.*	Medical
Amer.	American	*Monog.*	Monograph(s)
App.	Applied	*Occup.*	Occupational
Br.	British	*Pers.*	Personality
Bull.	Bulletin	*Personn.*	Personnel
Canad.	Canadian	*Psychol.*	Psychology Psychological
Charac.	Character		
Clin.	Clinical	*Rep.*	Report(s)
Consult.	Consulting Consultation	*Res.*	Research
Edu.	Education	*Rev.*	Review
Educl.	Educational	*Sec.*	Secondary
Engg.	Engineering	*Soc.*	Social
Exp.	Experimental	*Sociol.*	Sociological
Guid.	Guidance	*Statist.*	Statistical
Ind.	Indian	*Stud.*	Studies
Measmt.	Measurement	*Univ.*	University

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International Education Year 1970—Development of Educational Research

Unesco

> *We reproduce for readers Unesco's document on the development of educational research, a priority theme during the International Education Year 1970. This document, as Unesco's introduction states, "provides basic information and suggests directions for study, discussion and action; no attempt is made to analyse the subject exhaustively or to express the official view of Unesco".*
>
> Editor

When the General Conference of Unesco adopted a resolution on International Education Year, it set as one of the objectives of IEY the development of educational research. What does this imply both for educational research and for education as a whole? We propose to examine briefly in the following paragraphs what educational research is, what some of the problems are, and what the average person interested in education can hope from educational research activities in the next few years. But first a warning: education research

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is a relatively new and rapidly expanding field of work and as with any new domain of human effort, it is common to take one of two extreme positions: to deny the importance of research and neglect to give it adequate support; or to overstate the case and insist that research be carried out everywhere, as the panacea for all ills of education. We shall strive for a middle course and attempt to explain as realistically as possible what can be expected in and from the development of education research in the next ten years.

What is meant by educational research? It is, essentially, the process of applying scientific method in the study of education, with the familiar sequence of defining the problem, planning for the collection of data, gathering these data systematically and objectively, analysing them and finally drawing conclusions which are communicated to and can be verified by others. Educational research makes particular use of the methods developed in the fields of psychology and sociology but relatively recently, increasing use has been made of economic theory and methods for certain types of educational research studies.

I

Typical studies included in the programme of an educational research institution cover such fields as pupil learning and the passage of pupils through the school system; the curriculum; teaching and teachers; teaching and learning materials and equipment; the administration of education; preschool education; out-of-school education; education of adults; education of handicapped children and educational planning. The development of suitable tests of pupil learning (for example, achievement tests, intelligence tests, aptitude tests, etc.)

has often been the initial and principal activity of many educational research institutions. Such tests were initially elaborated in France early in this century in order to assist the Ministry of Education to select children who did not do sufficiently well in primary school and for whom special instruction was to be provided. The use of such tests has now spread widely, to industry and to the military services, but the initial impetus came from the "felt need" of educational administrators. Educational research activities have continued to revolve very much around the use of tests.

An area of research which is now becoming of increasingly greater importance is curriculum research. The validity and relevance of what is being taught has been questioned in many countries, and resources have been made available for large research projects evaluating different aspects of what is being taught in schools. Such studies often include examination of teaching methods, of teaching materials, of examination systems. All of the studies involve an amount of pupil testing.

A general nation-wide examination of what was taught in the schools and what the children were learning was carried out in Japan in order to evaluate effects of the school system introduced by the Americans after the Second World War. Thailand (through the Bangkok Institute of Child Study) undertook a major evaluation of the primary school curriculum in 1963. These were very large-scale research efforts calling for considerable resources both in men and money. The Swedish school reform has been accompanied over a period of some twenty years now by a series of studies of curriculum and of pupil achievement; and in many other countries both government financed and privately financed research studies of particular aspects of school curriculum have been carried out. As a result of educational research in the Soviet Union, new curricula have been prepared for all forms of primary and secondary schools, and the elementary phase of schooling was shortened three years ago. New curricula and new textbooks in Soviet schools now correspond more closely to the requests of scientific and technical progress. Soviet school reform being carried out today is based on broad educational research work by the Soviet Academy of Pedagogical Sciences.

However, as Professor Wiseman, Director of the National Foundation for Educational Research in England and Wales, remarked in a recent article, there is a certain reluctance to pursue curriculum evaluation with the same enthusiasm as curriculum reform. A substantial number of educators, as well as the general public, have a strong dislike of educational tests and measurements, which are often seen as instruments of control and condemnation. The importance of their application to the validation of curriculum and teaching methods is not yet appreciated. A recent controversy in the United States of America around the "National Assessment Program" underlines Dr. Wiseman's point, where the American Association of School Administrators said: "We call attention to the fact that there are ways other than testing to assess education; and we reiterate our abhorrence of any program of national testing whose failure to allow for differences among regions or localities would make it inherently unfair". (It may be remarked that much of the opposition has been appeased by a full-scale public relations programme and work is proceeding, financed by a grant from Congress, as well as grants from various private foundations).

Endeavours to deal with teacher shortages have called forth a considerable amount of research into methods and techniques of teaching. Programmed instruction, which was a direct outcome of basic research on learning, has been extensively researched for educational purposes. In recent years there has been an increasing amount of research on teacher training, in particular with development of more refined observation methods (such as micro-teaching, for example). The International Conference on Public Education, at its XXIXth session, Geneva 1966, stressed the need for psycho-educational knowledge of the child as the starting point for any educational activity. According to the conclusions of this Conference, in order to attain efficiency to its fullest extent, educational research, like any other scientific research, must be carried through by means of the joint action by teachers, educational administrators, educationalists and psychologists on the one hand, and by economists, statisticians and health workers on the other.

II

Few educational research institutions have a programme touching on all research areas. Many of them are fairly highly specialized, some (particularly those connected to a university) being devoted to a limited and specified field of research (for example, bilingualism). At the other extreme, some institutes, also particularly among university institutions, have no specified programme and allow more or less complete freedom to staff members to follow their own research interests. Most government-financed or government-dependent research institutions have a broad programme of activity, handling day-to-day problems referred to them for immediate information and advice, as well as producing more long-term studies on problems connected with the evaluation of policies currently in operation or suggested as desirable. Few government research units have the staff, time or money to undertake basic research which is generally left to the universities.

There are a number of autonomous research institutions working outside the orbit of a government department or a university. Various national councils (founded in the 1930's) and a few national institutes of educational research (established since the end of the Second World War) provide examples of this type of centre. Their programmes are usually very wide in coverage, and include both basic and applied research.

Each type of organization has its advantages and disadvantages. A university institution may have full freedom in selection of problems for research (such freedom having an almost irresistible attraction for the research worker) but a government institution usually finds it easier to get funds and implement research findings. The government institution usually has greater facility in obtaining access to schools, and other educational establishments, for the purpose of carrying out research. However, in many instances government research results have been accused of distortion for political considerations. Each country has its own appropriate institutional structure to find; there is no one solution or answer that can be selected as a guide.

Many countries are in danger of setting up too specialized research institutions. It is difficult to change staff and structure of any institution; although the importance of an educational problem may diminish, highly-specialized staff tend to continue to work on their special field of interest with a consequent waste of resources. Only where there is considerable intellectual interchange among research workers can a country afford highly-specialized institutions. Even then (as was recommended by the Expert Meeting on Educational Research convened by Unesco in Toronto, August 1968), the functions of any institution should be reconsidered from time to time.

It is probably superfluous to underline the importance of *national* research for national purposes. One of the comments from a Regional Workshop on Research on Primary Education (Bangkok, 1961) is none the less worth emphasizing: "In the long run, adequate research relative to the educational needs of each Member State can only be carried out within the country itself by nationals of that country. Studies made elsewhere can often provide worthwhile leads and in the absence of local data must be used as the basis for development and improvement; but, as experience has shown, often bitterly, methods and techniques which work in one system are not always suitable to another. Similarly, foreign experts, however skilled and sympathetic to national needs, are neither sufficiently close to local conditions to see many of the implications of research findings nor sufficiently aware of the subtleties of national problems to design research which will always be highly relevant. National research institutes or centres, properly staffed by well-trained local personnel and adequately furnished with research equipment, must be developed."

Closely allied to the need to develop educational research centres in each country is the even more urgent need to train educational research workers. No country has more than a small nucleus (small, that is, relative to demand) of competent persons with research training and experience. Some countries have no one with suitable training.

III

There are very few full-time research workers. Most persons carrying on educational research work have teaching duties and there is frequently a conflict between time given to research and time given to teaching although, theoretically, one activity should enrich the other. In fact, one of the serious problems of many research institutions is how to obtain sufficient commitment of research workers, both as to total number of hours worked and time of day (or week) during

expensive and too difficult to train large numbers of people in a reasonable period of time to the level of designing and planning research work. This is not necessarily a disadvantage. Experience has shown that even untrained teachers can be very useful if they are given short, intensive training. At the level of routine work, such as the gathering of data, coding and basic analysis of data, teachers provide a large and available labour supply, often eager to participate in research work, and whose assistance can be invaluable once appropriate organizational steps have been taken.

It has been frequently claimed that educational researchers should initially be trained as teachers before they are trained in research methods. Such a claim probably results from a failure to distinguish carefully the exact skills required at the various levels of research work plus a failure to organize appropriate research teams in which the teacher can play a full role. The research worker's training is sufficiently long and expensive to avoid in so far as possible additional training for a profession which he is not expected to practice. On the other hand, a good case can be made for the inclusion in a teacher-training programme of an introduction to research concepts and methods (e.g., statistics, measurement theory, educational sociology, educational psychology). Professor Kajubi, a leading Ugandan educator, has urged that it is of special importance in countries where the education systems have followed a traditional system largely borrowed from that of another country (as, for example, in former colonies) for the teacher-training institutions to produce teachers who are sceptical of traditional patterns, who not only comprehend the results of research but who demand research to guide them in their teaching.

IV

The prevalence of the desire for change in the training of educational research workers may be in part due to the computerization of educational research. Computers have had an inevitable effect on the size and design of research projects, as well as a more indefinite but none the less real effect on research attitudes. The old-time professor with his piece of research in the bottom drawer of his desk is no longer quite respectable. The prestige of the experimental statistically impeccable sciences has permeated the educational research world. The enormous investment in human and material resources in "natural science" research has made a marked impression on the educational research world. The relative independence from day-to-day university and government control of the large scientific research laboratories has a great attraction for the educational research world. Conceptions of organization and administration of research are becoming similar. It is probable that this assimilation of the attitudes and characteristics of the world of "scientific" research will have a profound effect on the world of educational research in the next twenty years, and the separation between the educational research world and the universe of educators will more likely result in divorce than reconciliation.

A minor but important consequence of computerization has been the study of the problems of research documentation. This has been one of the major advances of the 1960's, and we can expect to see a continued drive in the 1970's to provide an adequate international indexing system, in order to set up a useful information retrieval system, to meet needs of both research and informed consumer of research. In this particular field of action Unesco, with the International Bureau of Education, has been working for some time in co-operation with both national agencies and certain regional organizations (such as the Council of Europe), to evolve a satisfactory international classification.

V

The availability of the physical means for carrying on large-scale educational research projects has posed the crucial question of how much money should be spent on educational research. The Director-General of Unesco, Mr. Maheu, during the International Conference on the World Crisis in Education which took place in Williamsburg, Virginia, in October 1967, proposed that if serious effective work is to be done in educational research, at least two per cent of a national educational budget should be allocated to research. This is a fairly modest amount, but it is far from what is presently allocated. Few data are available on total expenditure on educational research, but various estimates made of expenditure around 1965 reflect a percentage of considerably less than one per cent in countries (Sweden, Australia, United States of America) which were among the leading countries in extent of exploitation of educational research.

Regardless of how much money is spent on research, from the national point of view support of research requires efficient allocation of resources. The Meeting of Experts on Educational Research (Toronto, 1968) greatly emphasized the necessity of planning resource allocation, both to ensure that the various research functions are being carried out (e.g., production of knowledge, development, demonstration, etc.) and to ensure that needed research topics are covered. For such purposes a number of countries have developed or are establishing central research councils for setting up research programmes and controlling research resources, or allocating research funds. It is very likely that an increasing number of these central research organizations will be established in the next ten years. A number of different organizational patterns exist. At one extreme we may have a special council dealing with educational research only and, at the other, one section of a national research council to control all aspects of research. The successful operation of such a council does not seem to depend on its particular structure, but rather on the effectiveness of its relations with the universities. The impact of the successful operation of such a council is likely to shift research out of the traditional university-type pattern harnessed to writing theses and qualifying for degrees and reflecting the special interests of individual professors into what will seem to many a more mechanistic pattern reflecting the demands of the large-scale consumer of research in relation to a tightly organized institutional supplier of research.

The relations of suppliers of research with consumers of research is occupying more and more the thoughts of the suppliers, that is, in this case, of the educational research workers. There is a growing problem of conflict of interests. Some of the questions posed recently by one of Sweden's leading educational researchers, Professor Torsten Husen, call for careful reflection: "What relation will guarantee the scholar's integrity vis-a-vis the client, which protects the undogmatic and critical attitude so that he is not tempted to become an evangelist for fear of cutting himself off from the pecuniary manna that flows from the client? To my mind, the essential thing is that contract research at an institute does not take on such dimensions as to trap the scholar in a process that follows a strict timetable, where he is under pressure to deliver "results" at all costs. There must be scope for the "irresponsible" and playful pursuit which constitutes an integrating element of all worthwhile research, a playing with data that can yield the most unexpected results. It is especially important for the scholar to avoid getting ensnared in research of the kind that makes him an executive project director, with his work-day completely absorbed by administrative tasks and where he falls easy victim to the greatest peril of all bureaucracy: giving top priority to making sure that the machinery operates with technical perfection, putting aside any qualms as to what this machinery is really supposed to do."

VI

These are important questions that call for much hard thought from administrators. (Researchers are already thinking and writing on the subject). When governments pay for research, it would seem expedient for government officials and others concerned to consider carefully ways and means of achieving the most effective results from this outlay. It is evident that bureaucratic rules are being applied to judge research processes and results; these are often more than unsuitable; they can be grotesque in their consequences. The field of research administration calls for change, and we can probably hope for some amelioration in the next ten years. The world of educational research will undoubtedly benefit from lessons learned in administering the large scientific research programmes.

In contrast, however, with the field of scientific research, in the world of educational research the role of the teacher when compared with that of the engineer is ambiguous, and remains to be clarified. At present the teacher is frequently treated as a consumer of research (which he seldom is in the true sense, neither paying for or otherwise asking for research to be carried on) or sometimes, as a producer of research. Probably some of this ambiguity is due to an exceptionally loose usage of the word "research" when every effort of teachers to study and thereby improve their own day-to-day practice becomes "research". Possibly the amorphous position of the school-teacher in relation to educational research could be solved if his position were equated to the position of engineer: a trained and able assistant in many research projects, particularly of an applied nature, as well as a trained practitioner in a field of work that the research worker is studying, able to advise the researcher on the actual practices of the field (but not on how to carry out the research itself).

In fact, if we again think of the problem of the engineer vis-a-vis scientific research, we realize that much of the debate about the dissemination of research results to the teacher is centered about false problems, and the real problem is the incorporation of research "results" into teaching and learning practices. Producing a report for teachers to read may not be the most efficient way to make use of research results. A well-known researcher on educational research, Professor Guba of the United States of America, remarked that in industry 5-11 times as much investment was required to develop a practical application from a basic research finding as was necessary to produce the basic idea in the first place. Development was a very complicated process which neither practitioners nor researchers were particularly competent to carry out. Highly trained specialists were required to do the job.

During the past decade a number of countries have made definite efforts to institutionalize the development aspect of educational research. For example, the United States of America and Sweden have set up special centres for this purpose. In the Union of Soviet Socialist Republics the close association of teachers with research work, the widespread utilization of experimental schools and of "problem laboratories" and in general the constant emphasis on improvement of practice seems to create a situation where "development" is not a problem. (It is interesting to note that research plans presented for authorization and funding by USSR research councils include a section covering possible ways of introducing results into practice.)

VII

Summing up this over-view of prevailing present-day trends in order to achieve some idea of development in the world of educational research in the 1970's and 1980's, we can say that without doubt, the problems of education have become so politically important that most governments will be calling for as much assistance as can be financed to help solve the problems. Educational research as a means of providing information and evaluating situations will be forced into an institutional pattern to provide as rapidly as possible quick answers to urgent questions. Such an institutional pattern gives rise to two major problems: firstly, what is the proper balance (that is, what is most efficient for the provider of resources and user of research) in planning and administration of research between producer "laissez-faire", and governmental predetermination of objectives and control of research processes; secondly, what is the relationship that should be established and fostered between the professional educational researcher and teachers, school administrators on the one hand, between the professional educational researcher and the university on the other. Answers to these two problems are being experimented now. It will be some time before any generally satisfactory solutions are proposed, and decisions taken in the area of scientific research policy will greatly influence the solutions found for educational research.

The Methods and the Materials of Functional Literacy[1]

H. S. Bhola

This paper, partly descriptive and partly speculative, deals with the methods and the materials of functional literacy. Based on the author's experience of literacy work in India and on his work in Tanzania on the pilot project that is part of Unesco's World Experimental Functional Literacy Programme, it also makes use of the work done by other literacy workers in other parts of the world. It goes beyond what has been done to speculate on what can be done in this area, and seeks to bring the insights of social engineering, curriculum planning and instructional technology to bear on the methodological problems of functional literacy.

This paper deals with the methods and the materials of functional literacy. Both the methods and the materials are indeed crucial, first for operationalizing the functional literacy concept and then for testing it.

The methodology is particularly important for functional literacy workers since the functional literacy concept itself is partly methodological. The materials, again, are important since in the materials is the concept ultimately embedded. The materials structure the teacher-learner and the innovator-adopter interactions in the classrooms and in the discussion groups, on the farm or inside the factory.

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[1] Paper presented to the Unesco Workshop on Functional Literacy held at Addis Ababa, Ethiopia, 28 April-12 May 1970.

The author would like to say here that this paper constitutes an individual professional contribution and does not commit either Unesco or the Government of Tanzania in any way whatsoever.

This paper is partly descriptive and partly speculative. Naturally, the author draws on his experience of literacy work in India and on his work in Tanzania on the pilot project that is part of Unesco's World Experimental Functional Literacy Programme. It also makes use of the work done by other literacy workers in other parts of the world. But it also goes beyond what has been done to speculate on what can be done in this area. It seeks to go beyond description, that is, and seeks to bring the insights of social engineering, curriculum planning and instructional technology to bear on those methodological problems that seem to be the daily concern of all functional literacy workers.

The Methodology

It is the thesis of this paper that the implementation of a functional literacy programme is not only an instructional problem but that it must involve a social change strategy as well. A functional literacy worker therefore needs to wear bifocal lenses—he needs the perspective of a social change agent while he focusses on literacy to make it play a generative role in socio-economic reconstruction of communities. A general theory for planning social change strategies has therefore been suggested before discussing how curriculum-construction theories may be applied to the problems of building curricula for functional literacy projects.

The crucial methodological problem of integration: (i) of literacy with vocational knowledge; (ii) of the verbal with the teaching of manual skills; and (iii) of the core content with the supporting programme content is discussed in detail.

The Materials

The importance of instructional materials in a functional literacy programme is then discussed in another section. It is suggested that the ideology and the theory of functional literacy must be embedded within the format of instructional materials produced, and these materials be given to teachers and workers *to use*. That is, the field workers (literacy teachers, supervisors, and discussion leaders) should be seen as *users* of materials and not as curriculum makers. It is also important to have the materials produced both for (a) learners, and (b) teachers; and to have not only (i) written materials but also (ii) audio-visual materials and media, and (iii) packaged demonstrations and vocational workshops for field practice. Special emphasis is put on functional-literacy primer construction, and some hints are offered on the use of audio-visual materials.

THE METHODS

I

The methodology is important in any instructional situation but in Unesco's World Experimental Functional Literacy Programme it is crucial. Unesco, indeed, set out to test a specific concept defined by a set of statements.[8] Not all find the Unesco definition theoretically elegant[9] but with all its definitional shortcomings and with all its lack of conceptual elegance we must analyse the Unesco concept, in terms of the theoretical, ideological, and methodological constraints it might imply and within those constraints invent methodological solutions. It is indeed part of the thesis of this paper that the Unesco functional literacy concept is partly methodological.

It is to the exercise of analysing methodological constraints of the concept and to suggest methodological solution(s) that this paper is addressed.

II

The methodological concerns of functional literacy workers are not new, though not much help has been available to them from professional communities.[4] Most of methodological ideas have, therefore, been generated *within* the literacy enterprise. In December 1968, for instance, Unesco organized a seminar[5] that was to discuss primarily the questions of methods and techniques of functional literacy. The seminar was not as barren of ideas as the preliminary mimeographed report[6] on the seminar might suggest. Some of the presentations, at least, did have some methodological content and these are briefly analysed below.

---

[8] See *An Asian Model of Educational Development (Perspectives for 1965-80)*, Unesco, Paris, 1966, Page 97. See also the *Final Report of the World Conference of Ministers of Education on the Eradication of Illiteracy* (Teheran, September 8-19, 1965), Unesco, Paris, 1965 (ED/217).

[9] John Bowers, "Functional Literacy: Definition and Evaluation", in *Report of a Unesco Workshop on the Evaluation of Functional Literacy Projects*, 9-21 August, 1969, Institute of Education, The University of London, U.K.

First a report from Brazil. We quote:

> The use of a computer in a Brazilian project is expected to cut by half the amount of time needed to learn to read. The CVRDC Mining Company, Brazil, which has started a functional literacy programme for its staff with Unesco-assistance, has used a computer to determine the frequency of words and syllables used by local workers. This literacy programme is closely linked to the technical promotion and vocational training of the staff.
>
> The computer has shown that the basic vocabulary of 2,300 words is made up of a total of 540 different syllables. Sixty per cent of the words use as little as 9 per cent of the syllables; and 20 per cent of the syllables, i.e., about 100 syllables, meet 80 per cent of the speaking requirements. On the basis of these data,

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[4] Literacy has not so far interested university communities. Understandably, no help in conceptual clarification or methodology has been forthcoming from that source. The only university group that the author has seen engaged in literacy *research* was Project Literacy of Cornell University, Ithaca, New York. However, the research questions they discussed were more or less culture-bound. These seem remote to the problems of literacy work in underdeveloped parts of the world. See Project Literacy now collected in H. Levin and Joanna P. Williams (eds.), *Basic Studies on Reading*, New York: Harper-Row, 1969.

Unesco itself, while it has published lots of materials on evaluation plans and problems has not paid similar attention to methodological concerns. A Unesco paper dated 11 May 1967, entitled, "How to Develop Work-Oriented Literacy Curricula" with all its foresight, was general in nature. Another Unesco paper dated 6 October 1967, "Functional Literacy Methods (ED/WS/34)", was rather rudimentary and merely talked of method being based on the "psychology of man at work". A comprehensive monograph on methodology is promised by Unesco but is still unavailable.

[5] Seminario Internazionale Unesco-UNLA, Rome, 14-20 December 1968.

[6] Report of the II Commission, "Pedagogical Conclusions", The Seminar. (Mimeographed)

> a teaching programme has been worked out which should cut the normal duration of reading lessons by half.[7]

As we can see, the essential point made in the above description is that of the use of a computer to make word and syllable counts and to use the minimum of syllables in writing reading-materials. This then was *one* answer to the question on methods of functional literacy. The only additional information that the Unesco-UNLA seminarians got from *the oral* report in Rome was that the mining instructors were used in the programme as teachers and they taught in a *one-to-one situation.*

Another experience brought to the Rome seminar related to the technical promotion of illiterate workers.[8] The programme taught literacy and vocational skills together in the environment of an industrial plant. It was essentially a vocational training programme preparing workers for specific posts with definite promise for promotions to the new posts. Reading, writing, numeracy, reading of drawings, understanding of scientific principles of physics and mechanics, all formed part of the instructional content.

The methodological task consisted in task analysis, analysis of symbolic, verbal, and representative content needed to teach vocational tasks, and combination of the two types of content into some pragmatic progression. The structure used was manual (or vocational) structure, and linguistic considerations were allowed to go overboard, hoping that motivations and opportunities to use learnt words in the plant would carry learning to objectives. In individual sessions the well-known method of teaching in industrial education was used. That was to present an actual machine unit, present simplification of reality through model or chart, help to understand the underlying principle, help learners to construct responses on the simplified model and test performance on the actual machine unit.

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[7] From Unesco Features as reproduced in the *Indian Journal of Adult Education,* January, 1969, Vol XXX, No. 1, Page 15. This same report was presented, orally, at the Unesco-UNLA seminar in Rome in December 1968.

A recent report, entitled, "A Functional Literacy Experiment in an Industrial Environment: Brasil—Vale do Rio Doce", issued with *Literacy—A Newsletter,* January, 1970, Unesco, Paris provides an excellent description of the Brazil Project. Unfortunately, most reports thus far from the Brazil Project had emphasised the use of the computer and thus had been unfair to the Project.

[8] This experiment is described in great detail in C. Maguerez (*La Promotion Technique du Travailleur Analphabete,* Paris: Eyrolles (61 Bd. St. Germain, Paris 5e), 1966. A summary of this book was presented by the author to the seminar in Rome.

It was the description of a useful experience of vocational/industrial training with some literacy added, if reading labels can be called literacy. Nevertheless this description pointed out the difficulties in integrating literacy with vocational training.

A report to the seminar from Esfahan, Iran,[9] again described the methodological steps in curriculum building for workers in an industrial setting. The steps employed were as follows: (a) orientation of the management to the Project's purposes; (b) ascertaining the role of written instructions in the factory's production tasks; (c) on the basis of an analysis of costs of illiteracy, the selection of 'points of impact' for curriculum development; (d) study of the technical processes around the points of impact; (e) timing and sequencing of selected topics for instruction to achieve improved and efficient production; (f) production of daily instructional sessions; (g) preparation of guidelines for the group leader, especially with regard to the ways of helping learners to acquire a global mastery (comprehension, recognition and writing of 500-600 words; (h) production of supporting teaching aids for daily instructional sessions; (i) training of group leaders; (j) execution of programmes; (k) production of a book for the learner group as a summary and by way of consolidation of learning to date.

The report from India[10] emphasized two training elements of the Indian Project: vocational skills and intellectualization of the economic tasks performed. That is, farmers were given opportunities to see why certain steps were taken and not some others. Civics and social education were taught where they were found directly related to the basic productive concerns of farmers. Instructional modes were basically these: organization of production-cum-demonstration camps, and establishing vocational groups in villages; conducting 7- to 15-day vocational courses for teaching the adoption of the high yielding varieties programme; creation of discussion groups; and use of audio-visual materials and the printed word.

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[9] J.C. Leven and C. Bonanni, "Taj Factory Experimental Programme (A Case Study)," Iran/Unesco/ILO/UNDP Project (Esfahan Pilot Scheme), Rome: The Seminar, April, 1968.

[10] T.A. Koshy, "Work-Oriented Literacy Pilot Project in India: Pedagogical Methods and Techniques—An Analytical Description", Rome: The Seminar. (Mimeographed.)

Literacy classes were created out of the discussion groups and they were taught through specially written work-oriented adult literacy primers—probably one of the better set of primers produced within the Unesco World Experimental Functional Literacy Programme.

Being individual contributions from different projects these reports were necessarily descriptive of what methodological problems were faced in each one of the projects and how they were solved.

There is need to rise above specificities and to discuss methods of functional literacy on a conceptual level indicating: (a) what methodological constraints are inherent in the concept, (b) what alternatives are provided by curriculum theory and instructional technology, and (c) how methodological solution-invention may be done for a particular occupational group, in a specific milieu to achieve objectives of functional literacy.

III

Method is a special form of procedure, especially in any branch of mental activity, says the *Concise Oxford Dictionary*. The question for us then is: What is the "special form of procedure" for implementing a functional literacy programme ?

Bruner in his book, *The Process of Education,*[11] has talked of the varied structures of disciplines and, therefore, of the different method of teaching for each discipline. Right there goes our hope of having one method for functional literacy for we know that a functional literacy programme, in its instructional aspects, must involve teaching of reading, writing, arithmetic or accounting, vocational skills that may be industrial or agricultural, citizenship, health, and something else of relevance to a particular community.

Education is a process involving disciplines and their structures, learners with various motivations and learning-styles, and with differential verbal and graphic abilities; and teachers coming from different social backgrounds and with different self-images and capacities for work. Also, all teaching-learning situations cannot have the use of the right instructional technology but may have to do with less. Methodology thus is not simply a technical matter but is also the art of the possible.

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[11] Jerome S. Bruner, *The Process of Education,* New York: Vintage Books, 1960.

The Encyclopedia of Educational Research in fact avoids saying anything by way of definition of educational or instructional method but goes directly to "Methods of Teaching" and deals with the review of research on methods of teaching under four headings:

a. interpersonal relations and the teaching process;
b. patterns of teaching;
c. techniques for individualizing teaching; and
d. specific activities in teaching, which includes such matters as classroom motivations, relating learning to student needs, developing interests, making assignments, appraising progress.[12]

Talking of the method of adult education (an area, by tradition, the closest to literacy) Hallenbeck has this to say:

> The general purpose of adult education is to help adults to increase their capacities and their satisfactions in life and to understand and accept the responsibilities of membership in their communities. This overall objective covers a multitude of specific objectives. Since there is a great variety of purposes and since the combinations of circumstances are almost infinite in number, the problem of method is not solved by inventorying methods which have been successful but by considering factors which determine method. ....When the problem of method is solved, the problem of technique arises. Method is concerned with how best

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[12] Chester W. Harris (Ed.), *Encyclopedia of Educational Research* (Third Edition), New York: The Macmillan Company, 1960, page 848. The index to the same volume refers to the methods of teaching of adult education, agriculture and extension, arithmetic, reading, writing, business education, character education, college and university education, English, literature and communication arts, family-life education, health education—to mention only a few entries. Patterns of instruction are also called methods, such as the project method, laboratory method, activity method, etc. The lecture method, and the discussion method are also methods of education; as is the method of individualized instruction. (Pages 850-855). Since functional literacy programmes are amalgams of varied instructional contents we cannot think in terms of *the* method of functional literacy.

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> to do the particular adult education job, technique with how to carry out the method selected. Consequently, the adult educator, after clarifying purpose, must be able to select successfully from the vast array of methods and to execute methods through techniques.[13]

The above statement could in fact be applied to functional literacy programmes as well if the *economic* emphasis is added to various other concerns for improving adults' capacities. The overall objectives of a functional literacy programme would in fact cover a multitude of specific objectives which can be clustered around at least two or three middle-level objectives:

1. Teaching of reading, writing, and arithmetic,
2. Teaching of agricultural or industrial skills,
3. Teaching of improved social, co-operative, and political skills.

Obviously we would need the linguistic method,[14] the vocational method, and the extension method[15] to implement our programme.

A Rational Approach

A rational approach thus seems to be to drop the search for *the* method of functional literacy but to consider instead the factors that might determine method in a particular functional literacy programme. In other words, it seems more appropriate to discuss the methodology of functional literacy and apply it to particular programmes of functional literacy in particular socio-economic and cultural milieux.

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[13] Wilbur C. Hallenbeck, "Methods and Techniques in Adult Education," in Unesco, *Adult Education: Current Trends and Practices,* Columbia University, 1949.

[14] There are again many methods of language teaching, none proved more important and effective than the other and which again are seen to respond differently to different situations and groups. See Williams S. Grey, *The Teaching of Reading and Writing: An International Survey.* Monographs on Fundamental Education, X, Unesco, 1956. Also Jeanne Chall, *Learning to Read: The Great Debate,* McGraw-Hill, 1967.

[15] "The problem of method in extension education is a major one. The situation confronting the potential learner and the teachers is constantly changing. Continuing and more carefully designed research is needed if extension educational agencies are to be effective." (*Encyclopedia,* op cit., Page 496).

A functional literacy programme is not merely an instructional programme. People must change (through education and extension) but social and institutional structures must also be changed, and physical structures (canals, wells, clinics, etc.) must be built. These are not educational problems but those of planned social change. A functional literacy programme is thus also at the same time a social change programme. Functional literacy *is one approach to social change.* The methodology of functional literacy thus must be handled in two aspects: (a) as a strategy for planning a social change programme; and (b) as a problem of curriculum construction for a community of adults—with literacy playing a generative role in the total programme

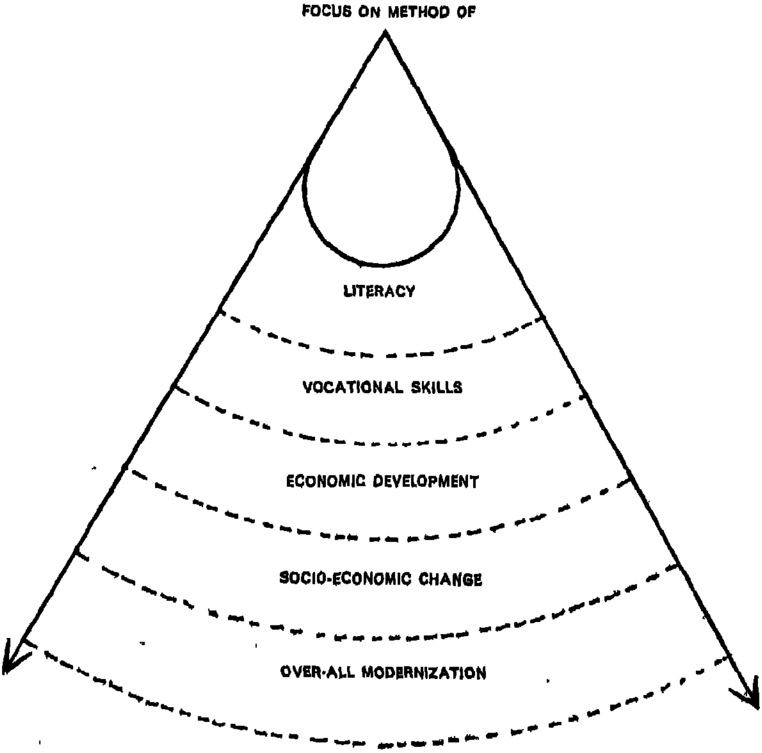

Fig. 1. Progressively widening methodological perspectives are necessary since Functional Literacy is one approach to social change and modernization

of instruction, innovation, and change. (See Figure 1 for a perspective on functional literacy methodology.)

IV

THE STRATEGY OF PLANNED SOCIAL CHANGE

There are many theories available dealing with the planning of socio-economic change suggested from all the different social science disciplines.[16] These theories relate to both developed and underdeveloped societies. They may range from Kurt Lewin's simple model—unfreeze, move, refreeze[17]—to more or less multidisciplinary change theories. There have been some attempts at suggesting *action* theories for the planning of social change that may be applicable to all the different social change situations, including, of course, extension, adult education, and functional literacy. One such theoretical model, namely, *The Configurational Theory of Innovation Diffusion* was suggested by the author.[18] It is not possible within the scope of the present paper to present this theoretical formulation in full but some ideas are included below to show how an enveloping social change strategy must be developed first and detailed functional literacy programme then carried out and implemented within an over-all strategy.

The theoretical model in question suggests an equation as follows:

$$\text{Max } D=f(C,L,E,R) \quad \ldots.$$

meaning that maximum diffusion of an idea, an attitude, a skill, a social/economic/cultural innovation is a function of C (Configurational Relationship between an innovator entity and the adopter entity), L

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[16] H. S. Bhola, *Innovation Research and Theory*. Columbus, Ohio: The Ohio State University, 1965, presents a review of theoretical literature and of research in the area of planned social change. (Available from the School of Education, The Ohio State University).

[17] Kurt Lewin and Paul Grabbe, "Conduct, Knowledge, and Accepance of New Values," *Journal of Social Issues*, 1, 1954, 64.

[18] H. S. Bhola, "The Configurational Theory of Innovation Diffusion," *Indian Educational Review*, Vol. II, No. 1, January, 1967, Pages 42-72. (Available in USA from ERIC/Educational Administration, University of Oregon).

(Linkages *between* the innovator and the adopter and within innovators and adopters if these should be collectivities), E (Environment of change effort), and R(Resources that may be financial, technical or of personnel).

It is for the innovator group (change agents) to ensure that on the basis of a system analysis of the community or society they are planning to change the work to maximize the four conditions represented here by C, I., E and R.

The first task of a planner of a social change strategy (and of a planner/methodologist of functional literacy) will be to *identify* the change agent(s) and the potential adopter(s). The change agent may be an individual, a group, an institution or a culture itself. Similarly the adopter may be an individual, a group, an institution or a whole culture. The configurational theory of innovation diffusion thus identifies 16 different possible configurational relationships between the changers and the potential adopters, as follows:

ADOPTER

		Individual (I)	*Group (G)*	*Institution (IS)*	*Culture (C)*
CHANGE AGENT (INNOVATOR)	I	I-I	I-G	I-IS	I-C
	G	G-I	G G	G-IS	G C
	IS	IS-I	IS G	IS-IS	IS-C
	C	C-I	C-G	C IS	C-C

The functional literacy planner when working out a strategy for planned change must know within which patterns he himself will be working and which will be the most dominant ones. As a part of a Project team and administratively linked with a bureaucracy he may find that the IS-I, IS-G, IS-IS and IS-C configurational relationships may be the more relevant to his work than other configurational relationships. The fact that most of the functional literacy projects have government support provides the functional literacy planner with a strong configurational relationship in terms of *influence*.

It should again be clear to the social change planner (and the functional literacy worker) that the human individual is ultimately the locus of all change. That is where change must occur, live, and multiply. The new idea, the new attitude or skill, and an innovative social, economic or cultural pattern must live within individuals. This makes the individual important but it does not mean that the innovator must reach every individual separately. Fortunately, men live within social structures: families, groups, and institutions; and an important strategy of change would be to contact and influence the others through them. This is one way of stating the celebrated two-step flow of information hypothesis.

The linkages *between* and *within* the adopter and the innovator systems must be considered. In functional literacy projects where more than one department or ministry will be working, linkages *within* the innovator system cannot be taken for granted. Linkages must be clearly established and kept open. Linkages must be created also *between* the innovators and adopters. Also, of course, *within* the community (adopter system). It is in fact the bias of communication theorists that creation of communication channels within a community is itself generative of change.

Environments can be created. They can be made to sustain hope and enthusiasm provided due attention is paid to the engineering of social environment and needed resources are committed. Mass media and leadership can be used to create conducive environments. But good consistent work must follow for people to keep believing in change and for feeding further hope among communities. Devaluation of words of leaders and innovators is the most unfortunate thing to happen to a social-change programme.

Resources of expertise, and money are obviously needed. There are, of course, known management principles to make the money go farther, and the personnel to give their best. Also, modern technology can help us to store, multiply, broadcast instructional messages from the better, more efficient personnel—all this to a certain degree. But these problems should be indentified, duly weighed and solutions devised as part of the over-all strategy.

We cannot go into further details of the theory but it should be obvious that the first stage in the implementation of a functional literacy project is devising a social-change strategy. One model that could be used for this kind of work has been suggested. It is now that we must turn our attention to the second chain of methodology—curriculum construction for teaching adults literacy and new economic and social skills.

V

THE METHODOLOGY OF CURRICULUM CONSTRUCTION APPLIED TO FUNCTIONAL LITERACY

For a general discussion of the methodology of curriculum construction the reader is referred to any standard work on the subject. Here we will be engaged primarily in the exercise of applying the methodology of curriculum construction to the instructional aspects of a functional literacy programme.

Three Aspects of Curriculum Construction

Curriculum making involves at least three different things: (1) Ideology, (2) Theory, and (3) Instructional Technology.

Ideology. Ideology is an important part of curriculum making. An educator or a field worker would reflect his value system in the curriculum he sets out to design. He will start with faith in some basic objectives and principles which he holds as self-evident and worthy of perpetual support.

A worker in the field of functional literacy will also have an ideology that will determine the shape of the curriculum he designs. For example, he would be committed to literacy as a new human right even though he would have additional reasons to support literacy. So whenever a choice has to be made between 'development alone' and 'development and literacy' he will support the latter. Also, in the actual implementation of the functional literacy programme he will be committed to the educational process and would not choose the manipulative approach. He will not merely want change but would also want client groups to understand change and learn to cope with it. He will also be committed to people's participation in making the decisions which will affect their homes, fields, and places of work.

The preceding ideological commitments are clearly linked with the choice of methods and techniques used in a functional literacy programme. Decision will not be made for the learners but with them, and this would mean a particular kind of teacher-learner interaction. The educational process would not be curtailed. Right means will be used for right ends. The cards will not be stacked against the community but explanations will be offered and offered again, however slow or frustrating the experience for the field workers. The choice of substantive content and activities to be included in the functional literacy programme would not be unduly disruptive of the life of the community though change must always involve some disruption. Efficiency will be subjugated to the sociological health of the community.

Functional literacy programmes, again, follow a *selective* approach in the choice of learners. The functional literacy approach, unlike the mass approach, selects certain occupational groups. These occupational groups must be such that can benefit from literacy and can in turn play a generative role in the over-all development of the country. This, again, is an ideological choice that dispenses with the usual thesis of equal opportunities for all, right away, from the very beginning.

The ideology in a functional literacy programme and the methodological constraints it implies should thus be obvious.

Theory. Theory is another essential component of all curriculum making and naturally of curriculum making in functional literacy programmes. The two essential theoretical antecedents of functional literacy are: (i) that literacy when directly linked with an economic development programme would act as a multiplier of economic change; and (ii) that literacy when taught as a part of the teaching of economic skills would be inherently motivational for adults in developing countries. In other words, the theoretical position is that literacy can play a generative role in the socio-economic development of communities; that the literacy pill will have to be gilded with economic advantage both in process and effect; and that since poverty is an acutely felt deprivation in developing countries a functional literacy programme will be well received.

This is a short and simple outline of the theoretical antecedents of the functional literacy programme.[10] As in the case of the ideological aspects of curriculum making, these theoretical aspects also put definite constraints on the method(s) designed for implementing the programme. The obvious constraints are: that literacy must be taught in the context of and as a part of the teaching of a chosen economic and vocational skill; and that literacy must be taught to select, more or less, homogeneous occupational groups.

Instructional Technology. The third component of curriculum construction is technique or, more generally, the technology of instruction. We know enough today about the structure of knowledge, about the psychology of individuals and sociology of groups and communities to understand our client groups in classes and outside in the communities and devise both programme and methods that are appropriate. At the same time electronic hardware has given us immense capacities for storing, duplicating, and broadcasting knowledge through radio, recordings, films, television—and paperbacks. Together these two advances in electronics and behavioural sciences have given us a powerful educational technology that we can use to solve curricular problems and to design programmes and methods responsive to our particular ideologies and theoretical orientations. But even here some situational constraints are involved. The first set of constraints are perhaps found in the professional limitations of those who may come to work on those projects. They are by no means all of them instructional technologists and common sense cannot go further than it actually does. A second set of constraints emerges from the peculiar situation of our work. We cannot use television where none exists, nor make use of films if none are being made in the country we happen to be working in.

VI

THE CONTENT OF FUNCTIONAL LITERACY

Let us now apply, on the one hand, the ideological constraints of the concept, and, on the other, the insights of instructional technology to the selection, organization and presentation of the content of functional literacy. To apply any method(s) of teaching we must know what is to be taught. A prior question, therefore, is: What is the content of a functional literacy programme?

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[10] For a more detailed discussion of the theoretical antecedents of the concept of functional literacy, see H. S. Bhola, "Functional Literacy—The Concept and The Programme," a paper presented to the Annual Study Conference (August 1969) of the University of East Africa, since published in the *Indian Journal of Adult Education,* Vol. XXX, No. 12, December 1969, Pages 3-4, 10-16.

It may be recollected that the concept of functional literacy commits us to demonstrate the generative role of literacy in development. Hence both literacy and economic skills (selected to be improved for economic development) must form the content of the programme. Another theoretical directive accepted by us is that literacy must be taught in the context of and as a part of the chosen economic activity. In other words, the teaching of literacy must be integrated with the teaching of better economic skills in the chosen economic sector.

Again, though 'literacy and vocational teaching' form the *core* of the functional literacy content, they are not enough. (See Figure 2 on page 31.) These are necessary but not sufficient for a functional literacy programme. The functional literacy project, while it provides vocational education and literacy, must at the same time—and this is a partly ideological and partly theoretical commitment—provide supplementary content in health, hygiene, child care, house building, co-operatives, and citizenship. It must not be forgotten that the idea is to produce an efficient citizen—farmer and an efficient citizen-worker and not merely an efficient production unit.

Some further points related to Figure 2 may be noted here. Literacy at the core of the diagram should be broadly interpreted. Arithmetic should be an important part of teaching in addition to reading and writing (1, 2). Understanding of symbols, graphs, drawings and maps should also be taught. The latter is not as difficult to do in an industrial setting as it is when working with rural groups.

Again, as indicated in the figure literacy must be taught as integrated with the economic activity. It does not mean, however, that everything else in the programme should also be integrated *similarly*. For example, literacy will not also be a component in the teaching of citizenship, health, and housing. Trying to bring literacy in everything would be absurd. We cannot give to the same group of learners a couple or more parallel starts in literacy! Audio-visual and discussion methods must be used in teaching this other content.

It is important to think here of the system metaphor both to understand the comprehensiveness of the content and the need for a

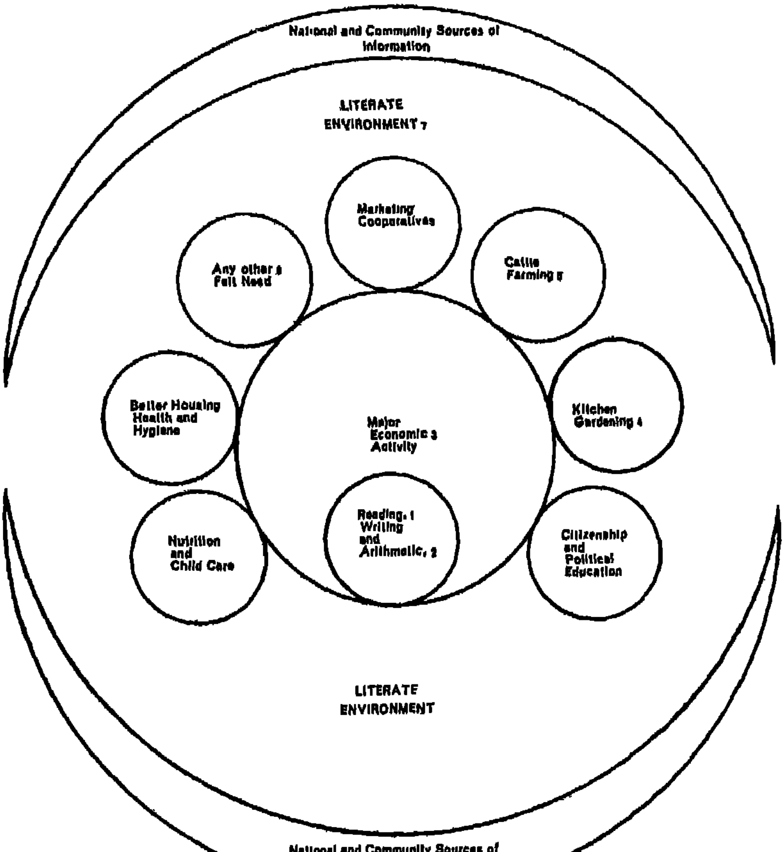
National and Community Sources of Information
LITERATE ENVIRONMENT 7
Marketing Cooperatives
Any other 6 Felt Need
Cattle Farming 5
Better Housing Health and Hygiene
Major Economic 3 Activity
Kitchen Gardening 4
Reading, 1 Writing and Arithmetic, 2
Nutrition and Child Care
Citizenship and Political Education
LITERATE ENVIRONMENT
National and Community Sources of Information

Fig. 2. A graphic presentation of the contents of a Functional Literacy Programme

diversification of the methods and the materials. We must agree that literacy should be taught as a part of the teaching of economic skills. But the primer alone would not teach all the economic skills: it would, by itself, only have taught some verbal information. Lots of actual demonstrations on the farm or factory must be made part of the instructional system. Also, printed material is not the only resource available to the functional literacy methodologist. He has the whole cafeteria of audio-visual materials to choose from, to teach visually what he must to make the functional literacy programme truly comprehensive.

The economic activity should be selected on the basis of a detailed system analysis of a community chosen for field work. The economic activity should be selected for its likely generative properties in bringing about economic, social, and cultural change. Once a *major* activity has been chosen it doesn't mean that all *minor* economic activities like kitchen gardening or cattle-keeping for family use should be banned. In fact subsidiary economic activities like kitchen gardening
nd cattle-keeping should be built in into the programme—though not
o the primer. In Africa one major problem of development has
n the separation between farming and cattle-raising. It would be
rd to teach farmers cotton-growing without reference to cattle
andry or food crops for their own consumption (3, 4, 5).

t should be clear that the content of circles around the core
s selected in accordance with local needs. The various content
own in the diagram (Figure 2 on page 31) are by way of exam-
and are not prescribed for all projects (6).

whole programme must be linked with the literate environ-
the community and the nation. Where no literate environment
a community it must be created by the functional literacy
by establishing rural newspapers, opening village libraries,
g reading and discussion groups, and establishing community
r radio listening. Such work must be undertaken *along with*
ing of literacy classes. It should not be postponed (7).

VII

er questions must now be raised and answered. How will
n be achieved at the *core* in the teaching of literacy and voca-
ls? How will a list of instructional activities for learners be
? The economic activity may have its own cycle and calen-
literacy has its own: how will the two cycles be reconciled?
ill be the sequencing?

The chosen vocational activity is the core of the functional literacy programme and integration between literacy and vocational training the crux of the problem of methodology. It is implied in the very choice of the economic activity that it admits of considerable improvement and innovation. The farmer or worker can improve his productivity so much through adoption of new skills that he will not only better his own economic status but also contribute significantly to the over-all national development effort.

But skills, as we have discussed before, are only part of the problem of social and economic change. A whole set of variables are involved in the engineering of change. To go from a present economic situation, $EC_{(P)}$, to a future economic situation, $EC_{(F)}$, there may be involved: (i) teaching of new information and knowledge, (ii) teaching new skills, demonstrating new ways of doing things, and use of new tools; (iii) promoting new attitudes to work, to the organization of work; and (iv) making available new tools, and other material inputs. In planning economic change, therefore, a comprehensive view would be necessary.

In the following we will focus only on the *instructional* aspects of changing a present economic situation $EC_{(P)}$ to a future innovative economic situation $EC_{(F)}$. These instructional aspects can be grouped under three main headings—information, attitudes, and skills. (See Figure 3 below.)

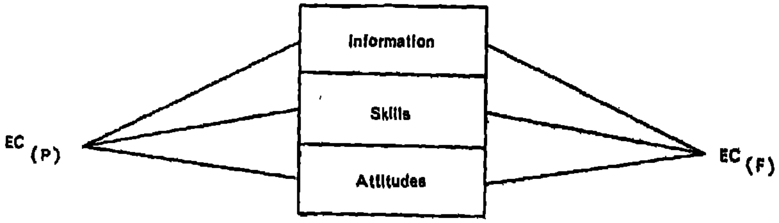

Fig. 3. Three-lane path from the present economic situation to a future economic situation

Teaching the Core

Teaching the core of the total functional literacy programme (See Figure 2) has priority. Detailed objectives, both general and specific, must be defined in terms of needs, possibilities, and time schedules.

These objectives must be translated into day-to-day instructional activities. To do so we must go through the typical curriculum making steps: analysing objectives, listening activities, clustering related activities, putting them in a learning sequence; developing teaching techniques and materials to teach small instructional units—ultimately to achieve the over-all objectives as laid down.

Task Analysis. In the case of functional literacy that must involve teaching of a vocational skill, the first thing would be to make a task analysis of the economic activity to be taught. This will be done by the agricultural/vocational specialist and the curriculum maker together. The future vocational pattern, $EC_{(F)}$, will be analysed in terms of hierarchy of skills. This hierarchy will take different shapes: in agriculture it will be a time hierarchy so that preparation of the field may be taught first and application of fertilizers later on. In an industrial setting the hierarchy of tasks may be differently organized: teaching the handling of a spanner may come before and teaching dismantling a gearbox later on.

Let us suppose that the task analysis has given us a list of smaller *tasks* and their arrangement as follows:

$$T_1, T_2, T_3, T_4, \ldots\ldots\ldots\ldots T_n.$$

Teaching of these tasks will involve teaching many new *manual* skills. But as we did indicate before, bringing in a new way of accomplishing economic tasks is not only a matter of teaching new skills. New *attitudes* (and new pieces of information) are involved. The teaching of some of the new tasks may involve new attitudes. Before, for example, T_4 can be learnt the learners may have to change their itudes towards the task itself. An agricultural task may involve col- g cowdung for use in the field but collecting cowdung, attitudi- may be considered socially inferior by a particular caste or roup. Hence a new attitude must be learnt. An analysis of s that must be learnt to perform new tasks may then give us representing attitudinal learning:

$$A_1, A_2, A_3, A_4, \ldots\ldots\ldots\ldots\ldots A_n.$$

The tasks and attitudes so analysed must then be studied for ir verbal (or what could be called their symbolic/linguistic) con- t. This is an important step because the symbolic component of e new economic task must provide the basis for teaching literacy to adult learners participating in a functional literacy programme. What do we mean by verbal and symbolic component? Very simply it means that reading, counting, diagram-reading, measuring would be involved if the new economic activity has to be taught meaningfully to the adult learners. For example, to teach new methods of wheat cultivation in Punjab, India, or cotton cultivation in Tanzania, the farmer must develop not only new scientific concepts of agriculture but he must also learn a sense of precision in the dimensions of time, lengths, quantities and volumes. The ridges must be of the right height and must be placed at exact recommended distances. The amount of fertilizer used per acre must be just right in weight. The *dawa* added to water to prepare the spraying solution must be right too. To prepare a farm plan the farmer must understand the concept of area, and should be able to measure it, and divide it. To be able to understand what he will get (outputs) for what he will spend (inputs) he must learn accounting. He must be able to read labels, cautions on chemical containers and instructions from the government extension office. This symbolic analysis of tasks should give us a list of symbolic content such as:

$$S_1, S_2, S_3, S_4, \ldots\ldots\ldots\ldots S_n.$$

The task analysis of the economic activity will give us the 'vocational units' and their sequence. The attitudinal analysis will give us what attitude changes need to be handled. These may be handled separately through films, campaign posters, or lectures, or may be taught as part of the symbolic materials. The symbolic analysis is the basic ingredient and dough from which a literacy programme of reading and writing will be developed. Herein is one important opportunity of achieving the integration between 'economic skills' and 'reading and writing' by developing special reading materials which show the interrelationship between the two from the very beginning and thus can sustain the motivation of adults struggling with the written word during their first few days in literacy classes. We will have more to say about this later. However, it should be noted here that to achieve the teaching of the core different types of teaching approaches will be needed. Economic skill will need field demonstrations or workshop practice. Needed also will be poster campaigns, films or radio dramas for attitude change. And it will involve the use of primer, readers, numiber books, etc., to teach literacy. This fact should not be lost sight of: that a functional literacy programme is comprehensive in terms of content, methodology and in the use of materials. (See Figure 4 below.)

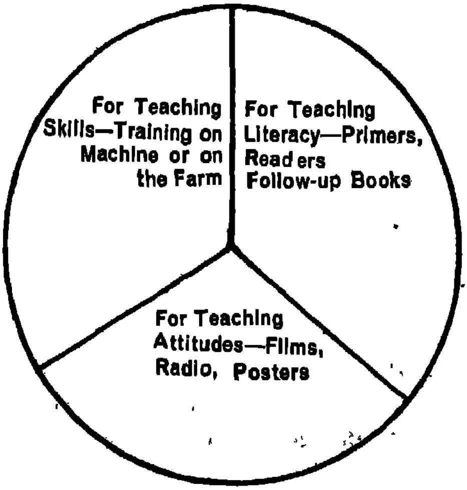
For Teaching Skills—Training on Machine or on the Farm
For Teaching Literacy—Primers, Readers Follow-up Books
For Teaching Attitudes—Films, Radio, Posters

Fig. 4. Methods and materials of teaching Functional Literacy

Teaching the Non-Core Content

Let us again examine Figure 2 showing the content of a functional literacy programme. Let us note, again, the comprehensive nature of the functional literacy programme. Indeed some functional literacy programmes have been seen to have degenerated into literacy classes with a primer, and that is all. The teaching of attitudes (through use of dramatic materials and films) is lost sight of and even the teaching of *skills* of agriculture or industry are sometimes forgotten. (This happens more often in programmes in the agriculture sector.) But almost always the supplementary activities shown in the outer circles in Figure 2 are forgotten.

Unless these various supplementary content areas are also put through the curriculum making process, and limited objectives are defined for each of these areas no teaching is likely to take place and the total programme is likely to be seriously truncated.

Let us repeat here that it is not necessary, in fact it is absurd, to try to teach all these content areas as integrated with literacy. We do not have to write separate primers for teaching the various supplementary content areas nor do we have to wait until our learners have become literate and can read our folders and leaflets. Most of the teaching in these content areas will be done with the use of visual materials and in discussion groups. Some of these content areas may need skill demonstrations. Only in the later stages of the programme when adult learners in classes have already learnt to read, will written materials like leaflets, booklets and follow-up books be used to teach these supplementary areas.

Figure 5 on next page summarizes in one place the discussion in this section.

VIII

Figure 5 presents three converging streams of instruction in a functional literacy programme with comprehensive content. Some of the ideas included in the figure need further comment.

First of all it must be noted that the concern of a functional literacy worker should not be limited to the small group of adult learners in his literacy classes. He must consider the community they are part of. Some of the important decisions regarding change may not be made by the adults in the classes but by husbands, or fathers in their families. It is important, therefore, to design concurrently a programme directed towards the general community. It should be noted then that along the three streams shown in the diagram some of the programmes are meant for literacy classes and the general community together.

Now we must address ourselves to the important question of integration. How are the three streams to be integrated into one programme ?

Integration of Three Instructional Streams

Problems of integration are part of all curriculum construction. In school curriculum also, it is attempted most often to provide a focus to all learning. The intention is that knowledge should not be presented to students as compartmentalized but that they should be enabled to

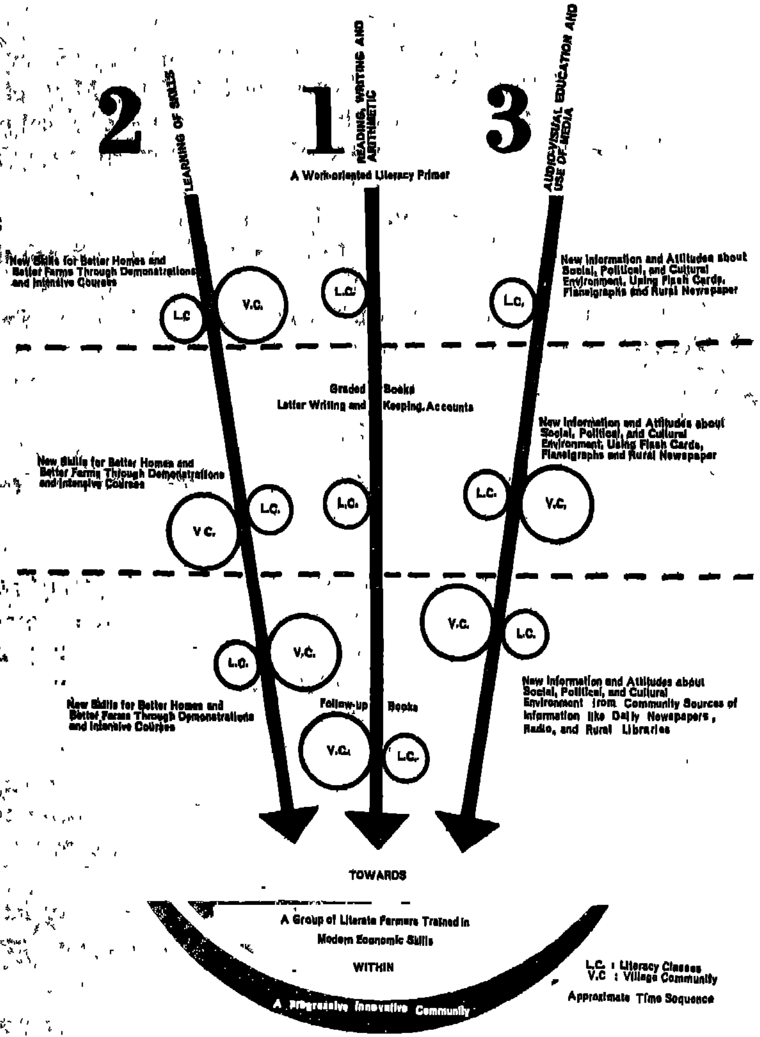
2
LEARNING OF SKILLS
1
READING, WRITING AND ARITHMETIC
A Work-oriented Literacy Primer
3
AUDIO-VISUAL EDUCATION AND USE OF MEDIA
New Skills for Better Homes and Better Farms Through Demonstrations and Intensive Courses
L.C
V.C.
L.C.
L.C.
New Information and Attitudes about Social, Political, and Cultural Environment, Using Flash Cards, Flanelgraphs and Rural Newspaper
Graded Books
Letter Writing and Keeping Accounts
New Skills for Better Homes and Better Farms Through Demonstrations and Intensive Courses
V C.
L.C.
L.C.
New Information and Attitudes about Social, Political, and Cultural Environment, Using Flash Cards, Flanelgraphs and Rural Newspaper
L.C.
V.C.
V.C.
L.C.
L.C.
V.C.
New Skills for Better Homes and Better Farms Through Demonstrations and Intensive Courses
Follow-up Books
V.C.
L.C.
New Information and Attitudes about Social, Political, and Cultural Environment from Community Sources of Information like Daily Newspapers, Radio, and Rural Libraries
TOWARDS
A Group of Literate Farmers Trained in Modern Economic Skills
WITHIN
A Progressive Innovative Community
L.C : Literacy Classes
V.C : Village Community
Approximate Time Sequence

Fig. 5. Three converging streams of instruction in a Functional Literacy Programme

learn to look at the events of their lives in their totality. Various methods have been devised in the school context to achieve integration; some of those can help the functional literacy worker as well.

Integration is, of course, part of the theory of functional literacy. We may recollect one theoretical bias of functional literacy: that literacy should be offered to learners in the context of and as a part of a chosen vocational skill. In other words some integration of literacy teaching and the teaching of vocational skills is essential for the implementation of the functional literacy concept.

It must be understood at the outset that there is no such thing as hundred per cent integration. In fact two curriculum makers may not always agree on the quality or extent of the integration achieved between various aspects of content in one learning unit. Integration, therefore, is partly an intuitive matter.

Integration may be of two general kinds: *organic* integration, and *additive* integration. Organic integration may be achieved when two content areas are taught as one discipline, when their separate structures are combined in one, and when such generalizations are developed that result from the two disciplines together and not from either of them separately. Social studies may be considered an instance of the organic integration of history, geography and some civics. But it is not always possible to achieve total organic integration between two content areas. While some of the integration between two areas of content may be organic the remaining content may have to be integrated into a common programme by what may be called an 'additive' process.

Both types of integrations will have to be resorted to to build a comprehensive programme of functional literacy.

Organic Integration

Primer and Readers. The literacy primer provides an excellent opportunity for integrating literacy skills and vocational knowledge. This is one reason why some of the functional literacy workers are so sanguine about writing special primers for functional literacy programmes. Without a primer, they think, something very important will be missed.

Here we may go back to our discussion of the theoretical antecedents of functional literacy. It has been indicated before that it is an important theoretical constraint that literacy—the teaching of reading and writing—should be undertaken in the context of the chosen vocational activity. This is possible by using the insights provided by the global method of teaching reading. It is not necesary to describe here the details of the global method of teaching literacy. Essentially, it consists in presenting to the adult learners a meaningful sentence that they can understand and relate to their immediate interests. This sentence is analysed into words and then into syllables and alphabets to teach reading and writing to adult learners. As a Unesco document says:[20] "It is as easy to learn to read 'This is hybrid corn' as it is 'This is a tall man.'" The functional literacy concept and the linguistic theory thus can support each other. An organic integration is possible to achieve in the primer by the adoption of a global method of language teaching and offering sentences with vocational content, in some linguistically supportable sequence, to teach reading. But not all integration can be organic as we have stated before. A lot of it will have to be obtained additively through detailed programming, sequencing, and interlacing. We will deal with this point more in the following.

Reconciling Vocational and Literacy Cycles

The problem that occurs in teaching the *core* (Figure 2) is reconciling the time cycles of teaching literacy and the economic skill. In industrial settings, perhaps there is more control of the total instructional situation and things may be comparatively easier to handle. For example, if literacy has to be taught to textile workers both the vocational cycle and the linguistic can be controlled to *coincide* with each other *more or less* as shown below. The interlinking lines indicate corresponding points of contact.

As indicated in Figure 6 on page 41, the two cycles could be made to match in terms of time so that when adults came to classes to learn 'reading and writing' they have already got some *oral* vocational vocabulary and some vocational/manual experience, in the background of which the primer had been constructed. Notice that the lines of connection betwen the two cycles slope from the vocational cycle to the literacy cycle.

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[20] "How to Devlop Work-Oriented Literacy Curriculum," A Unesco Document dated 11 May 1967. (Mimeographed)

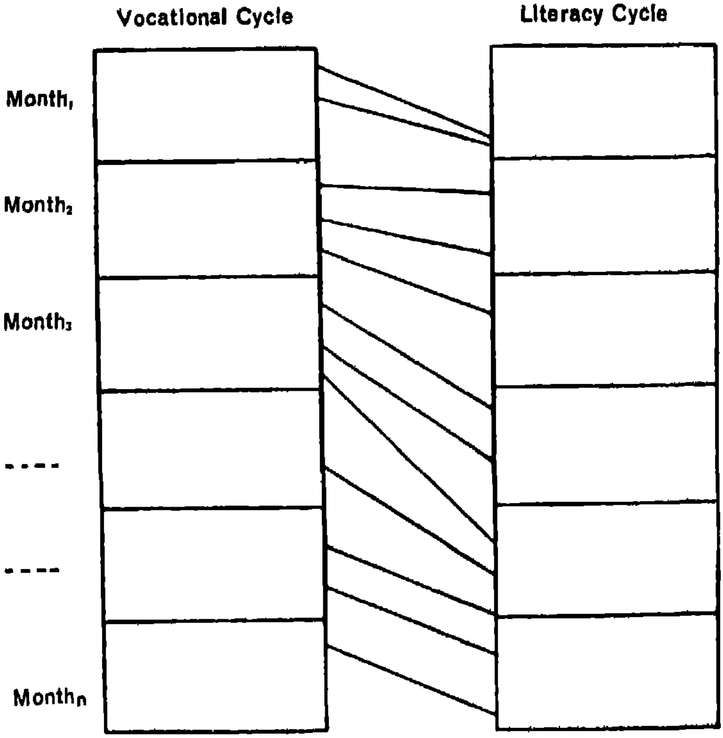

Fig. 6. Parallel matching of the two cycles: Vocational and Literacy

It is not always necessary to have the lines sloping in this fashion. This kind of sloping is important where the vocational experience is completely *new* to adult learners as in a textile factory which would draw its labour from neighbouring villages—we are, of course, talking of developing countries—and where the labour force would never have had any textile experience, and might as well have never seen a power loom. However, where adult learners have some experience in the vocation being taught in improved form some flexibility is possible in matching time cycles.

Take the example of a special course for women interested in home economics. Whatever the amount of *new* techniques introduced in cooking, cleaning, bathing children and so on, there would be lots and lots of experiences that women would have had already in these areas before they came to join home economics classes run on the functional literacy pattern. Except in the areas of sewing and stitching, the slopes may thus go both ways: sometimes literacy (the verbal component) may be a step ahead of vocational teaching while most of the time the vocational may lead so that there is enough practical/manual experience available to learners to hang their discussion and literacy on. They will be thus able to relate words, sentences and the verbal knowledge (these words and sentences convey) with things they have already experienced occupationally. See the figure below.

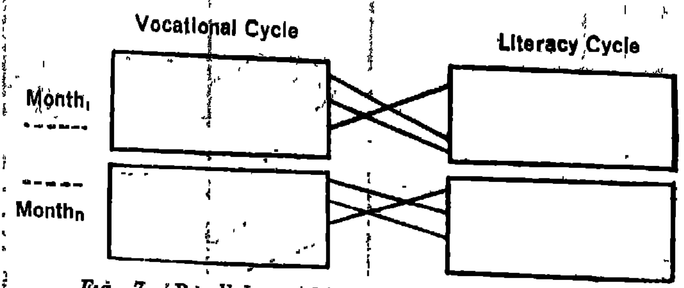

Fig. 7. Parallel matching of vocational literacy cycles with two-way slopes

Matching Agricultural and Literacy Cycles

The problem is more complex when we seek to reconcile literacy and agricultural time cycles. Let us examine a specific case. The example is that of the functional literacy programme[81] for cotton farmers in Tanzania.

The initial plans of operations agreed that functional literacy be taught in two nine-month sessions. Discussions with the agricultural staff in the region, however, seemed to suggest that nine-month sessions were not appropriate. They pointed out that the agricultural year for the Sukuma cotton farmer could be divided into two parts—the dry season and the wet season. During the dry season (May-October) the cotton farmer was on a kind of forced leisure while during the wet season (November-April) he was extremely busy in preparing the field, and planting cotton.

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[81] Unesco/UNDP Work-Oriented Adult Literacy Pilot Project, Lake Regions, Tanzania.

It is a well known extension principle that innovative agricultural practices should be demonstrated to farmers at a time when farmers themselves are engaged in similar work on their farms. This improves the probability of demonstrated practices being immediately put on trial and possibly adopted. It would have thus been useful to design a programme that taught literacy and new agricultural skills to farmers during November-April (with greater emphasis on agricultural skills) and then put through a concerted effort in teaching literacy and adult education during May-October. In such an event, during the second year, the farmers might have been on their own, and would have been able to handle extension leaflets and literature to follow agricultural advice.

However, the agricultural staff was of the view that during November-April of the year the farmers were too busy to attend *regular* literacy classes (though they assumed that they would not be unwilling to attend agricultural demonstrations) and should not be asked or expected to attend literacy classes.

As a result the project decided to hold literacy classes during May-October—during the dry season—and agricultural demonstrations were postponed to the months of November-April.

A detailed evaluation of the project's impact is still in the future but some questions may be asked: Were the farmers really too busy in the months of November-April to attend classes? If they were too busy to attend literacy classes, were they not too busy *also* to attend demonstrations? Did agricultural demonstrations really take place and, if so, did they not snap contacts with the literacy programme? Was the primer really understood since the new skills discussed in the primer were not demonstrated to the learners?

The two cycles—the vocational and the literacy—thus are not integrated as we had hoped. The only integration that was available was *inside* the primer where the content dealt with was improved cotton cultivation. The situation was not tragic but not ideal either. The farmers did have a repertoire of agricultural skills on which literacy could be hung. The primer did include *verbal* knowledge of improved cotton farming. Also, demonstrations could still have been organized in simulated situations.

IX

SEMI-PROGRAMMED APPROACH TO INSTRUCTION

We have already indicated that integration can and should be achieved between the vocational and reading skills by writing suitable primers which teach reading through the global approach, using sentences and words from the vocational field. However, this is one of the few opportunities for an *organic integration*. The supplementary content in the functional literacy programme (See Figure 2 on page 31) will have to be integrated through addition and convergence (See Figure 5) and through *semi-programming of the teacher(s)*: that is, by providing the teacher with as detailed instructions as possible about what to teach, when, and how.

The attempt should be to structure, as far as possible, the teacher-learner interactions both *inside* and *outside* the classroom—and yet structure with enough built-in flexibility so that purely local needs can be accommodated in the instructional programme.

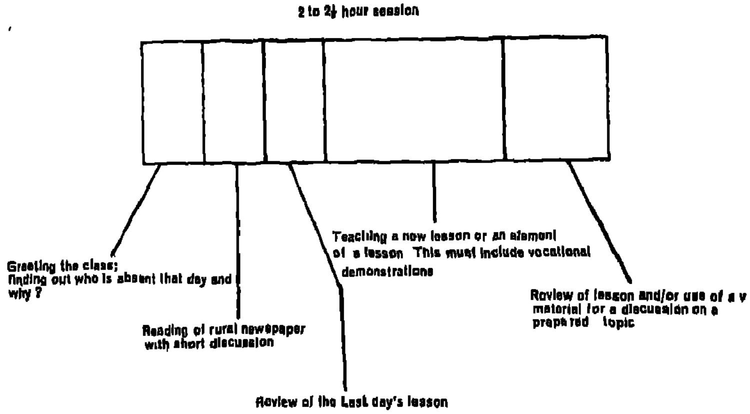
Defining Roles and Integrating Teams

It is necessary to define roles and to integrate role incumbents into teams. In an industrial setting most often the same person, probably a foreman will teach both vocational skills and literacy. Also, a factory or workshop provides a much more organized control system which can be used to instructional advantage. But even there the need for a detailed teacher's guide that establishes instructional formats is important. In other words it is important to help the teacher, as much as possible, in visualizing every possible step. This does not take away the teacher's freedom as it is sometimes naively stated; on the contrary it helps him professionally to establish a minimum level of performance. If he is professionally first-rate he may do better than what he has been told to do, but if he is not, he can at least perform at that level. This semi-programming of the tutor is essential both for programme integration and programme quality.

In the agricultural context it is not always possible to combine the functions of a vocational and a literacy teacher in one man. Extension workers are few in developing countries and they are given wide areas to look after. Assigning them to a class of 20 to 30 farmers would be considered impossible, even scandalous! Literacy workers talk sometimes of taking a successful farmer and training him as a literacy teacher, but there is no such thing, in developing countries as a successful literate farmer who would agree to teach agriculture-cum-literacy to his less advanced colleagues. One never meets a man to fit that description. Naturally we are left with a *team* approach where we have a group of ten to twenty underpaid, under-trained voluntary literacy teachers working with one or two extension workers in agriculture in an area. Integrating their activities is all the more important and expectations from both the teacher and the extension worker need to be most clearly laid down. One way of doing this is to work out lists of detailed expectations of work from each member of the team and also to articulate the points of collaboration between them.

To ensure that a literacy teacher on a functional literacy team does not relapse into teaching the primer alone he may be given a format for his daily lesson. One such format is suggested on page 46 (Figure 8).

Implicit in the following (page 46) format is the assumption that the adult class is being run as a *class*. We know, however, that all learners do not come to their class at the same one time and that they keep dropping in right down to the time when the class is about to end. It will thus be unfair for some of the early comers to wait for the others to join! Also, all adult learners in a class do not learn to read at the same speed. Some may reach Lesson 15 while a few others may still be at Lesson 6. This again breaks up the very concept of a class—which means a group of learners who are more or less at the same one stage of learning. If there never is an occasion when some lesson or material is presented to *all* adult learners together at *one* time we are not really teaching a class but a collection of individuals who share the same for following their individual interests, but who go on at their own pace of learning. Schools in many technologically advanced countries are trying to do just that—provide individually planned instruction. But the skill at the hardware (computors and projectors and tapes) needed for organizing Individually Planned Instruction is clearly beyond our means. Also, adult learners in a literacy class must be provided with group experiences and helped to emerge as a group. A literacy class must, therefore, at least during a part of the time, be run as a *class*.


2 to 2½ hour session
Greeting the class; finding out who is absent that day and why ?
Reading of rural newspaper with short discussion
Review of the Last day's lesson
Teaching a new lesson or an element of a lesson This must include vocational demonstrations
Review of lesson and/or use of a v material for a discussion on a prepared topic

The problem is difficult to solve. In the present writer's view the teacher should insist on the learners coming to the class in time. In fact it may be useful learning in itself to develop better concepts of time and to come to class reasonably[22] punctually.

Another bias of the present writer is that the class should be run as a class. There will be differences in the competences of adults in a class but the teacher should use this situation by asking those who are ahead to teach others and thus bring up the class together, thereby also providing the class useful lessons in cooperation.

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[22] In the remote rural areas of Africa and Asia it is not always possible to live by time. Farmers may tell time by the sun, the church bell, or by a bus that may be both infrequent and uncertain. Some resourceful teachers in Tanzania used a drum to assemble their classes—almost everyone arrived on the third beat of the drum.

Even where the literacy worker and the literacy teacher do not want to insist on the 'class' idea and want everyone to go on his or her own pace the *format* suggested is still usable. The newspaper reading in the beginning of the class and the group discussion (organized around a flash-cards set or a flannelgraph story) at the end of the class are useful opportunities to run the class as a class and to develop group cohesiveness.

A Total, Integrated Programme

Integration cannot be left to the teachers as we have indicated so often. In an actual instance teachers were given a primer and written materials on arithmetic, agriculture, clean water and bilharzia. It was hoped that everything would take care of itself: the teacher would integrate the materials into a functional instructional programme and also take the initiative to establish team relations with the agricultural worker. Well, nothing of the sort happened. Quite naturally the teachers taught the primer and then went home. The functional literacy programme became the primer-teaching programme.

To avoid this event an occurring systems approach must be followed in designing the total programme for the field for the whole duration of a programme phase. The programmers should particularly consider the teaching team: How many people will be involved in it? Will there be a separate literacy teacher and a separate vocational teacher? Will there be an animator or a community organizer added to the team? Will the teacher be whole-time or part-time? How will they relate with each other? Who will take the initiative for what, and when? Who will be the team leader?

It has been seen that on some of the functional literacy programmes no feedback has been built into the programme, even though they are supposed to be experimental programmes. Not even the periodical achivement testing of adults to test their level of reading and comprehension has been undertaken. Also, the programmes have no beginning and no end. Since no achievement testing of any kind is done nobody knows what objectives were achieved, when, and by whom? The classes begin but never end!

Even at the risk of being wrong, literacy classes must be given some completion dates: when most of the adults would have been enabled to read with comprehension at a particular predetermined level. And related with this is the requirement that achievement tests must be designed for periodical testing of the adults for: (i) reading and writing, (ii) vocational skills, and (iii) adult education content.

A functional literacy programme may suffer from underplanning and never from 'over-planning'. Perting techniques can be applied with advantage in implementation of programmes. Planning may be done for a year or two in advance. (See below.)

A Suggested Blank for Developing Field Programmes on Class/Regional/Project Level

	Vocational Skills/ Demonstrations	*Literacy and Numeracy*	*Audio-Visual Materials and Media*
1971			
January			
Session 1			
Session 2			
....			
....			
Session			
February			
....			
....			
December			
1972			
....			
....			
June			
....			
December			

This is a blank that can be used at various levels of programme planning. It will be something under constant change and adaptation. Each subsequent blank will have more and more details. But by attempting to plan one or two years ahead a synoptic view will be possible, objectives will remain in focus, and the teaching of some content areas would not be neglected by default.

THE MATERIALS

I

It is rightly said that revolutions in education are not brought about by philosophers and researchers of education but by textbook writers and designers of instructional materials. Philosophers may discuss emerging human needs and new societal objectives. They may discuss what the coming generations should study for a better world tomorrow. Researchers may develop new concepts of educational methodology and study learner motivations and teaching styles. But the common teacher in the classroom is unlikely to be aware of the new philosophies and of the new methodologies. Should he be aware of these he would not know how to translate them into classroom actions. It is the textbook writer and the maker of instructional materials who take powerful philosophic ideas, important research findings, and instructional techniques and put them in books and teaching aids thereby structuring classroom interactions and teaching and learning. Most teachers may then be using a new book or a teaching aid without understanding the philosophic and the methodological ancestry of what they may be teaching from.

The situation has to be the same in the field of functional literacy, even more so. The seventh-grade school leaver who becomes a literacy teacher in a village class or a worker-volunteer who teaches in a labour colony is not an educational philosopher, nor a curriculum designer. He would probably understand a few general ideas about the concept of work-oriented functional literacy but he would not be able to translate the concept into classroom procedures and field actions. At best he would be able to do one thing: with proper training, he will use with adult learners in his class the materials provided to him. It is thus for the functional literacy specialist to put his concepts into curricula, syllabuses and instructional materials. He should let the literacy teacher merely be a *user* of materials.

Materials are indeed crucial for the success of a functional literacy programme. They provide the basis for instructional transactions between the teacher and the learner; between the viewer and the demonstrator.

It bears repetition that it is *within* and *through* instructional materials that integration of content—literacy, economic skills, and general education—has to be achieved by the curriculum maker and the instructional materials producer. Also, unless materials are specially designed for the teacher himself (as, for example, guide books, and discussion sheets) functional literacy materials must be designed for adults. We cannot possibly give the teacher a reference book on agriculture or a manual on health and ask him to teach that material to adults. This would be to ask for the impossible. What we would indeed be asking the teacher in that case would be to read the reference material, understand it, develop out of his study of this material generalizations useful for his adult learners, and organize and present those generalizations with enough clarity and simplification so that these can be understood by the learners. This is clearly impossible. In fact all this must be done for him. All these steps must already have been taken by the curriculum maker and the instructional materials specialist. The material given to the teacher should be in the form in which it is to be presented to adults and the teacher should only be trained as a user of those materials. It might be that the teacher himself would be studying that substantive content for the first time—along with his learners !

Functional literacy is a comprehensive concept. Implementation of the concept naturally requires a comprehensive programme ! The core of this programme is the teaching of the 3R's integrated with the teaching of economic skills. But supplementary instruction on political education, civics, co-operatives, health and hygiene must also be provided. The total content does not have to be organized *temporally*. That is, we do not have to wait for the adults to acquire literacy skills first so that they can then *read* materials on health, housing, co-operatives and citizenship. There are other teaching techniques—the audio-visual methods—that help us to present a meaningful and comprehensive programme from the very beginning.

It is sometimes argued that the load of acquiring literacy is too much for adult learners struggling with the skills of reading and writing, and that things should not be made more difficult for them by offering them supplementary materials on health, co-operation, and such. First of all the assumption about load has not been tested and may be is a projection of our disbelief in the adult learner. Further, it goes against the concept of functional literacy with its focus on the whole man and only emphasis on the man as a producer. Also, diversification of content by adding supplementary materials (as in Figure 2 on page 31) is likely to provide a novelty factor so that adults have something interesting and meaningful from the very beginning of classes. This novelty in content may in fact hold many adults to the classes and keep them from dropping out. Also, it is very important that adults should be taught and given experience in information handling—one of the most important attribute of innovators and early adopters in communities. In discussion groups built around the teaching of supplementary content (through audio-visual aids and media) adults are provided excellent opportunities in information handling which should ultimately contribute to their learning literacy skills. Lastly, such an approach is contributive to creating in the communities an intellectual environment that is the most important part of organizing a functional literacy programme.

One-legged Race: The Emphasis on the Verbal

Most functional literacy programmes tend to be one-legged races. They use the verbal (both in written and oral forms) but the audio-visual methods of teaching are completely forgotten. Unfortunately, most of the people today in leadership positions in functional literacy and adult education programmes went to school when there were no such things as audio-visual aids. Some of them, most of them in fact, have managed to keep oblivious of the whole tradition of educational technology. Some of those who have familiarity with educa-

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tional technology and with the use of audio-visual materials know it at a level of awareness but have no competences in their planning, production and use. The result is unfortunate. One important educational resource is completely neglected: and that, a resource that is tailor-made for adult education in developing communities.

In the following then we will deal with the various materials of functional literacy, indicating their possible role in a functional literacy programme, and indicating briefly their special instructional features. It should be clear, of course, that instructional materials is a subject detailed enough for treatment in a separate book. Many excellent sources are available for use.[23] In the following only very short descriptions are included to sensitize literacy workers to some of the problems that are involved in the use of these materials in the context of developing societies engaged in literacy programmes.

In the table (on page 53) are included most of the materials that may have to be produced for implementation of an effective functional literacy programme.

II

FUNCTIONAL LITERACY PRIMER

The literacy primer designed to teach reading and writing is considered an important part of a functional literacy programme. Its importance is sometimes so exaggerated that once a primer has been written and produced the project team 'gets high' and everything else is forgotten.

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[23] See Karl U. Smith, *Cybernetics Principles of Learning and Educational Design*, New York: Holt, Rinehart and Winston, 1966, Edgar Dale, *Audio-Visual Methods in Teaching*, New York: Holt, Rinehart, and Winston, 1969; Educational Policies Commission: *Mass Comunication and Education*, Washington D.C.: NEA, 1958; Review of Educational Research: *Instructional Material—Educational Media and Technology* Vol. xxxii, No. 2 (April, 1962); *New Teaching Aids in the American Classroom*, Washington: US Office of Education, 1960; S.L. Ahluwalia and H.S. Bhola, *Audio-Visual Aids in Community Development*, New Delhi: National Council of Educational Research and Training, 1964.

TABLE

Instructional Materials Needs of a Functional Literacy Programme

	Materials For Learners	*Materials For Teachers*
WRITTEN MATERIALS	Primer	Teacher's Guide
	Exercise Book for Writing	
	Arithmetic and Simple Accounting Book	Teacher's Guide
	A Book of Personal and Business Letters	
	Graded Books (In Series with the Primer)	Teacher's Guides
	Follow-up Books for Independent Reading	
	Special Newspaper (With Readability Controls)	In-service Training Materials (Correspondence Courses or Newsletters)
AUDIO-VISURL MATERIALS	Drillcards for Language Teaching	
	Posters and Charts	
	Picture Albums	
	Flashcard Sets	Teacher Guide Sheets
	Flannelgraph Stories	Teacher Guide Sheets
	Community Resources	
	Folk Media	
	Films	Discussion Sheets for Use in Forums based on Discussion Community Resources
	Radio	
	Press	
DEMONSTRATION KITS, AND PACKAGED COURSES	Demonstration Kits with Tools and Implements	Guide Sheets
	Packaged Technical Courses	Guide Books

Can we have a functional literacy project for a specific occupational group without having to write a special primer for that group ? There is no one answer.

There are some literacy workers who feel that a special primer is not necessary. However, experience has demonstrated that the of *any* primer in a functional literacy programme deducts from both the strength and the visibility of the functional approach. The programme may indeed soon degenerate into a conventional literacy programme where the teaching of vocational skills may be completely forgotten or no integration may take place between literacy and the learning of new vocational skills. Even if vocational skills are included adult learners may be unable to link the parts and see any connection between the various streams of learning. This is basically against the functional literacy concept.

No doubt some other literacy workers consider the primer as basic and essential. The specially written functional literacy primer is considered as one point where integration of work and word can not only be achieved but also made visible for the adult learner. It is also considered important for sustaining the selectivity principle; that is, the primer helps to select learners—cotton farmers, fishermen, textile workers—thus giving homogeneous learner groups.

How Many Primers?

Some functional literacy projects may decide to have a dozen or more primers. While some geographical areas may have a really diversified occupational population there may be errors of judgment involved in having so many primers. These errors may come from two sources:

1. It may be assumed that whatever content is to be taught in a functional literacy primer is to be taught through a primer. Literacy workers may then be struggling with the idea of having an arithmetic primer, a health primer, a house-construction primer, in addition to a primer on a selected economic activity.
2. Many primers may also result from a lack of proper system analysis and defective decisions about what is a generative economic activity in that system. The concept of functional literacy considers selectivity as important. In one system it is possible, but improbable, that there should be one dozen or more economic activities needing immediate and equal attention.

Writing a Functional Literacy Primer

Functional literacy projects have so far undertaken to write their own primers. Private enterprise has not yet entered the field of writing of functional literacy primers. References are available on how to write primers.[24] However, these are often of limited assistance. In the writing of traditional primers the freedom to select sentences and sight words is much more than that available to a writer of a functional literacy primer. Let us see how.

Readers are, of course, aware of the various methods of teaching reading. The alphabetical method is the oldest and most of us are likely to have learnt to read with this method. There is the sight-word method in teaching-reading, and then the global method where meaningful sentences are shown to the adult readers, then broken into smaller units—phrases, words, syllables, alphabets.

It has been found that while all of these methods have some advantages, they have some disadvantages as well. The *eclectic* approach uses the best of the available approaches. It often starts by presenting some words in association with pictures. These words are then presented in one or two meaningful sentences that adult learners understand and find related with their lives. Sentences are then again broken into words. The words are then broken into syllables or alphabets depending upon the nature of a particular language. The learnt alphabets are then presented in different permutations and combinations to make new words and sentences. Thus is taught the basic linguistic process: that from known alphabets you can read new words and sentences—words and sentences that you had never seen before.

The Eclectic Method with Lesser Freedom

Most functional literacy primers that have come to this author's notice use an eclectic method. However, it should be noted that here the eclectic method is subject to serious constraints in writing a functional literacy primers. In a usual primer the writer has a much greater universe of ideas; the freedom to organize those ideas is greater; and, therefore, the choice of vocabulary that represents those ideas is more extensive. In the functional literacy primer the universe of ideas is limited—the primer has to tie itself to the teaching of better skills in a chosen occupation. The hierarchical or chronological ordering of these ideas is also largely predetermined—because each vocation has its own structure and hierarchy of tasks. This means that the vocabulary that represents those ideas or describes those tasks is also predetermined and is pre-ordered according to the logic of skills.

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[24] Karel Neijs, *Literacy Primers—Construction, Evaluation, and Use,* Unesco: Paris, 1961, Pages 112.

The ordering of vocabulary demanded by the teaching of new skills is not the same as the ordering of vocabulary demanded linguistically. The writer of a functional literacy primer is thus under two different pulls—the linguistic and the occupational. It does not mean that the two are irreconciliable. It does, however, mean that the freedoms in respect of choice of words are fewer and the writing of the functional literacy primer demands greater discipline.

Some Content More Plastic than Other Content

Take the example of a primer written especially for women.[*] The content to be included in it may be child care, balanced diet for the family, health and hygiene, sewing and stitching, etc. In such an area *different* content organizations are possible. One could begin with cooking and nutrition and then go on to other subjects. Or, another could begin with environmental cleanliness and go on to other topics.

Every topic will mean the use of some key words which the writer of primers can group together. From these word groups he can choose a cluster of words that offer the best beginning, linguistically, and then build subsequent sections of the primer on those words. For example, he could follow a route—b, c, f, a, d, e,—as shown on page 57.

But all occupational areas on which primers may be written do not offer the same flexibility in the organization of content and therefore in the linguistic organization of key words.

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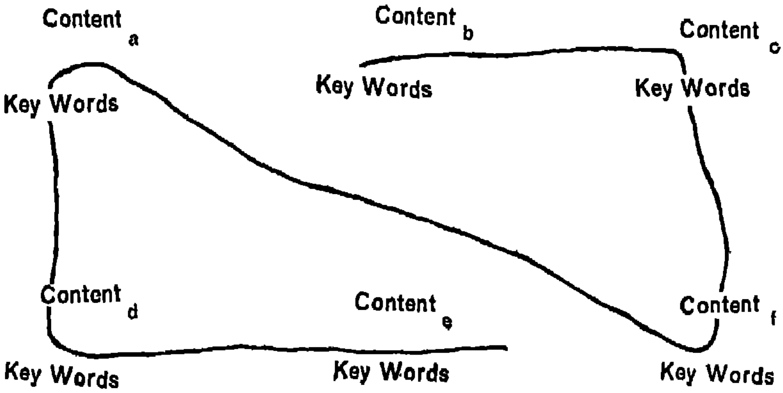
[*] It could, perhaps, be said that home science is not an economic activity in the strict sense of the word. In some communities, however, you find many more women offering to join literacy classes than men. A programme of special interest to the women hus becomes necessary. Also, home science as taught today offers a large amount of occupational/scientific content.



Team Approach to Primer Writing

Few literacy workers would confess their inability to write a primer. One might even offer to write it all by himself over a week-end. A good primer is not a one man's job. This is not to say that there are no people in the world who can do so. But such individuals are rare. The primer team must include a linguist, an instructional materials specialist, a content specialist and a field worker who knows the people and the area. They do not have to be working all the time around a table though some hours sitting around the table together would be necessary.

The following steps may be involved in the writing of a functional literacy primer.

1. Get a write-up on the improved occupational skills to be taught to adult learners. This must be authorized by the agriculturist/technician responsible for policy in that sector. Such a write-up on cotton farming, for example, may be a list of recommended practices with detailed technical notes on spraying solutions, making of tie-ridges, etc.
2. Undertake an observation study of the occupational group from which learners will be drawn. See them in their fields or work-places and in their homes. Find out what practices they follow now, and why. Find out what problems are likely to come up in the adoption of new im-

proved practices. Get their points of view. Especially try to locate information gaps and attitudinal problems.

3. On the basis of 1 and 2 above, decide the amount of skills-content to be taught, the level of this content and the special biases to be given to that content—inside the primer and in related instructional activities. Remember that a literacy primer is not a technical manual and everything that has to be taught in the aspect of skills does not have to be taught through the primer.
4. Make a *symbolic* analysis of the technical content, that is, analyse what words, concepts, patterns, must be taught to learners. In one case inclusion of areas, volumes, may be necessary; in another, reading simple diagrams may be important. (See earlier discussion on this topic on pages 34-35.)
5. Articulate the linguistic method to be used in the writing of the primer. Considerations of past practical experience and experimentation both would decide what language teaching approach would be used. But it must be articulated clearly for each member of the primer-writing team. This approach would also decide what *format* the primer should use in its lessons. Literacy primers at least in the first 10-15 lessons must follow a rather rigid format so that adult learners who are doing their first reading ever are helped to acquire a mental *set* and can start anticipating the kind of learning behaviour expected at various parts of the lesson. It is also important for the literacy teacher that a *specific* format be followed so that he can be trained easily in the use of this primer. Also, he can be helped to internalize the objectives of a lesson and to understand how the various parts of the lesson together contribute to those objectives. The use of picture association techniques; the use of sentences or words, that is, the choice between the global and word method; the breaking of words; do we go on to syllables to alphabets; the use of word elements to make new words and combinations; relationship between writing and numerical concepts: all these

questions and issues must be decided upon beforehand because they all decide the format of lessons.

6. Make lists of words that are needed to teach units of content, cluster them and put them in the order they would be used or should be introduced. Here the linguist would be helpful most of all. (See discussion above.) It is he who would now bring to the attention of groups the linguistic research available in the language on vacabulary counts, syllable counts, word difficulties, needed linguistic elements that must be learnt to be able to cope initially with the linguistic code, etc.
7. Now must begin the phase of group work. It is now that the group should sit together and work out the lessons. It should be clear to those who have participated in such work that it is not neat and clean work that you start and you finish. It is something you start and abandon, to make a new start. There are so many false starts that a neophyte would be discouraged ! This is one stage where no formulae can be suggested for creating a primer. Logic will help but more help will come from the heuristic, the creative, the intuitive.

How good a primer is will be judged from results. One does not have to wait for the primer to be finished and printed and then put into a testing phase with lot of fanfare and expense. A group of two women or men, representing the occupational group the primer is being devised for, should give the primer-writing group considerable feedback about whether the primer can teach. Here again perceptive groups would pick up ideas of what should go into the teachers' guide.

Materials Integrated with the Primer

Literacy primers using the global method generally have accompanying charts and drill cards—to drill words until they become sight-words. Some have pictures, both to create associations as well as to clarify and expose events, methods and processes. The teachers' guidebook, the primer, a score or more posters, and bundles of drill cards, the blackboard and the flannelboard thus make the teachers' kit.

While nobody could object to the merits of such an instructional kit there are some objections of a practical nature that apply to producing drill cards and using flannelgraphs in developing countries. First, the drill cards cost a lot of money to print. Second, the teacher is sometimes overwhelmed with all this material in his kit and keeps on losing track of the bundle he needs on a day. Third, the teacher can write words on the blackboard and drill them as much as he wants. An objection generally raised is that teachers do not write well. But it should be taken care of in the training of literacy teachers since the alternative is so expensive. As regards flannelboards they have to be imported at high costs. The picture posters accompanying the primer can be stitched together in a poster set and hung on the wall for studying when necessary. They need not be put on the flannelgraph board.

Teaching of Writing—When? And How?

The teaching of writing should be a part of functional literacy. Some workers would say: 'Writing can wait.' Not in functional literacy. The modern world is a world of cash economy involving counting, accounting, auditing, planning. Again, modern vocational skills need precision in measuring, weighing, observing. All these things cannot be handled through memory. They must be written down.

Some primers include writing as part of the primer. This is wrong for two reasons. One, the book can be used only once—and why should this be so in a developing country where the production of a primer may cost half a dollar or more. Also, the primer restricts the amount of writing an adult learner might have liked to do. Why restrict him? And this is not like life. Who writes in his books? The primer can, however, display model writing to which the learners may aspire and approximate to.

Numeracy

Should any arithmetic be taught through the primer? My own personal bias is that it should be. We cannot teach all there is in arithmetic through the primer but the way figures are written and some basic mathematical ideas should be introduced as a part of the primer.

No primer would of course take the learner very far with arithmetic. A separate book on arithmetic, therefore, should be a usual part of the functional literacy materials. Such a book could be programmed and the learners could follow it independently.[10]

Testing the Primer

Testing the primer is important. It can and should be tested at various stages. To begin with the first three to five lessons should be pre-tested. The completed primer should be tested in full. Revisions must be carried out. There is no such thing as a single-shot primer even when the writer is a genius. Good primers are not only good team work but they are also never the first drafts.

Publication of a Primer

A team of primer writers may have a surprise—an unpleasant one—waiting for them if they do not watch closely the production of the primer. The primer itself and the lessons making the primer, of course, have a structure of their own. Words, sentences, syllables may be broken, and placed with respect to each other in space, to help visual acuity or to help association or to serve some other linguistic purposes. If the lay-out artist and the typographer are left to themselves they may not understand the rationale and may take undue liberties with the text. I know about a primer written and revised and tested with considerable labour and investment of time and it came back from the press in a mess. The lay-out artist, to spread the pictures evenly, had disturbed the original structure of the lesson which required the adult to look at a picture, supply the verbal response, see the written word and associate the verbal and written, and go on from there. By taking the picture on the next page the lay-out man destroyed the lesson and almost killed the primer. Beginning a new lesson in the middle of a page (to save paper and plate-making costs) was another liberty taken that did the primer a lot of harm.

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[10] One such book on arithmetic, in programmed format, was prepared for use of new-literates in India. Pre-testing with adult learners gave encouraging results. H. S. Bhola and K. D. Sharma, *Navin Ghanit* (New Book on Arithmetic), Literacy House (P.O. Singar Nagar), Lucknow. (*In Print*).

Graded Readers

'Primer' is generally the name given to the little book used to introduce the barest minimum of reading skills. The adult learner does not become even semi-literate on a primer. He would still need to be held by the hand and led. This is done through graded readers directly related to the primer.

As the very name suggests these books are graded with respect to the primer. Sometimes they are given the name of 'Primer 2' and 'Primer 3'. Whatever the name the intention is to build the books up from the primer controlling (a) the number of words introduced, and (b) introducing these words in the order of difficulty according to empirical research.

It is perhaps not possible to write graded books without the basic linguistic research being available. Unless one can use a list of words tested for difficulty one cannot really know whether the words introduced by the writer in the first lesson of the first book are more difficult than those used in Lesson 8 of Book Three. There is no way of controlling this variable between books or between lessons in the book if graded word lists are not available. It is not even always known how many words should be covered in one graded reader. The only available option then is not to introduce too many words in lessons/ per page in the books. Here again we are on slippery ground. But then life involves working with insufficient data. As long as we know what we are doing and understand the limitations of our work it is all right. There will be scope for doing better.

It is not surprising therefore that sometimes it becomes difficult for the literacy worker to distinguish between the *graded books* and *follow-up books*. The distinction is conceptual. In practical terms one book that may be graded for one series of materials may be picked up for use as a follow-up book in another project or programme if the language used is the same. Conceptually, however, the distinction is rather important and should be made.

Four different levels of reading materials can be indicated.

Level 1: Community Sources of Printed Materials

All communities have some sources of information in print. These are the newspapers they publish, the periodicals they bring out, and books on history, politics, and fiction. A new-literate adult coming out of the literacy class could not read the material. The result was that through disuse of his literacy skills he lost them in a few years. Adult educators, therefore, understood the need of writing special materials for adults that adults could cope with, and providing them experiences to make the shift to community sources. These materials were given the name of follow-up materials.

Level 2: *Follow-up Materials*

These materials are specially written for adults with *readability* controls, readability being determined jointly by the number of words introduced, the level of concepts discussed, the length of sentences and other syntactical considerations. Subject-matter puts no limitation for follow-up materials—anything that is worth reading is worth reading by adults as part of the follow-up programme. In most follow-up materials programmes, however, socially significant topics are given precedence over other subject-matter.

Level 3: *Graded Books*

This has already been discussed in the preceding paragraphs.

Level 4: *Primers*

This again has been discussed elsewhere.

We may make here a point on the content of graded books. The content of graded books has to be related to the primer. This is important when graded material is to follow up on a functional literacy primer. However, content must soon be diversified. Small chapters on various topics related to occupational and social and cultural themes should be introduced.

Letter Books and Account Books

After adults have learnt to write they must be given an opportunity to apply their skills in a real-life situation. This will be helped if adults are taught to write letters and to address them properly. A special book of letters for various occasions written in a language that the adults can cope with and understand should be developed and used with adult classes.

The same applies to the need of using an accounts book for adults to help them use their mathematical skills in real-life situations.

Follow-up Books

Literacy workers often neglect a follow-up materials programme even when convinced about its usefulness. It is not considered urgent *now* and later it is often too late. As a rule a follow-up materials programme should be taken in hand as soon as other reading materials are planned.

Only a few points need to be made here about a useful follow-up materials programme since many references are available for those wanting to develop programmes for follow-up materials.[37]

1. The clientele of follow-up materials should be broadly conceived. It is not only the graduates of the literacy classes for whom the follow-up materials are written. They are *for the new reading public* which includes all the seventh-grade and elementary school leavers in a country.
2. Special efforts should be made to give due consideration to the scientific part of the human culture. Few available programmes seem to recognize that science and technology have become part of life even in the so-called remote parts of the underdeveloped world.
3. Where there are no writers available for writing follow-up materials, training facilities should be provided to produce, first, the writers, and then the written materials. There

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[37] *Simple Reading Materials for Adults: Its Preparation and Use*, Paris: Unesco, 1963. Also H. S. Bhola, "Books for the New Reading Public," *Lekhak*, Vol. IV, No. 2, July-September, 1967 and H. S. Bhola, "Do You Plan Your Books Before You Write Them?" *Lekhak*, Vol. IV, No. 3, October-December, 1967. Both issues of *Lekhak* are available from Literacy House, Lucknow, India.

are, of course, some educated people in all cultures. Suitable writers' workshops can be organized to train them for writing special materials for new-literate adults. The experience of Literacy House, Lucknow in the area of writers' workshops is both long and instructive.[28] It tells us that it can be done.

Newspapers for Adults

The special newspaper written for adults in literacy classes has the same functional status as the follow-up materials. The new-literate adult who comes out of literacy classes cannot go directly on to the daily newspaper from the state or national capital. This is so for two reasons: he is not attuned to the literate environment around him, that is, he is not habituated to looking up the newspaper; and if by any chance he stumbles over a newspaper from the town he cannot read and understand it.

Both to get him into the habit of reading a newspaper and to give him a newspaper that he understands, special newspapers must be produced within functional literacy programmes. These newspapers have the additional merit of creating a literacy environment where none existed before. Their role in building a literacy environment should not be lost sight of.

Like the follow-up materials the special adult newspaper should be written with a limited vocabulary. In fact there should be even stricter vocabulary control so that adults still in literacy classes can read it. The newspaper should not wait until the classes have learnt to 'read' because the teacher, in the first few months, should read the newspaper to the class. Again, the special newspaper should not just be an easier version of the newspaper from the city. It should be the adults' own newspaper reporting on events related to their own life, from their own immediate environment. The coverage of the newspaper should expand as interests of adults in classes expand.

Bringing out a special newspaper, however small, requires much effort. To make it related with the environments of the people there has to be some local news-gathering which is by no means easy. Again, production and distribution present difficulties in communities where no postal system may exist and where modes of communication may be few and far between. Therefore, a daily newspaper for such adult groups would be day-dreaming, a weekly would be enviable, but a monthly news-sheet would be the least that a literacy programme should do.

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[28] See Bhola, *Op. Cit.* Also H. S. Bhola, "Training of Writers: A Syllabus for Literacy House Writers' Workshop," Mass Communication and Training Department, Literacy House, Lucknow, 1967 (Mimeographed).

The communities that do not read newspapers or even see one rarely do not produce newspaper editors and correspondents. For some time in the beginning the project staff will have to issue the newspaper themselves. But shift of responsibility and facilities to the locality must be planned from the very beginning. This does not necessarily mean a newspaper written and distributed and edited by the adults in the community (though if that happens it would be great) but it does mean that the newspaper is produced by the local functionaries within the area of field work.

Related with the above is the question of production standards. Some literacy workers, once they hear the word newspaper, think in terms of the city newspaper or at least the tabloid. They look at the cyclostyled sheets of the special newspaper for adults with contempt or at most as the necessary beginning stage. They want newsprint and a press that produces a newspaper that looks like the real thing. Production standards, however, are of the least consideration in such a special newspaper. It should be readable and it should be related to the adult group for whom it is written. Then we must make the best of the printing facilities we have. Even a handwritten cyclostyled sheet would do.

Pricing questions bother some workers. They say that unless people pay for what they get they do not respect it enough. There is some truth in it but such newspapers cannot be priced so high that the adult starts making comparisons with the prices for city newspapers. A subscription of a shilling for two years (24 issues) should be considered completely adequate.

III

AUDIO-VISUAL MATERIALS

Posters

Most literacy workers are 'verbalists.' They seem to be unaware of the possibilities of visual communication in functional literacy. Even when they are vaguely aware of the communication potential of these materials they think in the terms of introducing these materials *after* some time when the literacy programme has been established.

Many authoritative resources are available on the production and use of audio-visual materials.[29] Only a few points need to be made here, specially about posters. One, that posters can play an important part in literacy work and in general adult education work. Two, that while designing posters simplicity should be kept in mind—the tendency to put all one can on one poster should be avoided. Three, the design should not be *abstract* and the figures used should be such with which the prospective viewers can *identify*. In some developing countries of Africa there are not many local artists available and expatriate artists and experts have to be brought in. They project their own background both in design and expression. The woman carrying a child looks like a Mado'nna when she should have been carrying the baby on her back. The farmer is made to wear shorts when the local farmer is differently clad. The community worker and the teacher has hair that are rather straight and a complexion that is not as black as it should be—it is a shade white![30] Also, visual communication experts should make a rough and ready study of local visual image and then make visual aids.

Picture Albums

Picture albums can be gripping and they can teach. Commercial publishers are even making money out of it in Africa. Even though

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[29] See Edgar Dale, *Op. Cit.*

[30] I showed one such poster published by an African Government to one seventh-grade school leaver and asked him "Where do you think is this man from?" "I do not know," he answered. I persisted: "Make a guess." "I cannot," he said, "He probably is a half-caste."

'educational materials' could not be made as sensational as the commercial producers can make their story material the medium is worthy of experimentation.

Flash Card Sets

Flash card sets are, as the name suggests, set of cards that are flashed before a group for study. Generally they are in the 8″ × 12″ size and are used with small groups so that every one can sit around a circle and see the card as it is flashed before the group by the teacher.

Flash cards are used to present an idea that needs to be broken down in parts and explained sequentially. Pictures, drawings, posters, and written materials can be put on the flash cards. They are generally printed on heavyweight paper so that they can stand upright without warping. On the other side is printed a verbal commentary that the teacher can use for discussion or can just read. This makes the material self-contained, and village workers with very little training can use them effectively.

Flannelgraph Stories

Sometimes a literacy teacher may like to build an idea or a story before the learners or even with their help. A flannelgraph set—a series of cut-outs of pictures, words, diagrams, slogans—can be very interestingly used with a class. The learners can participate in building a story around these cut-outs displayed on the flannelboard. The pictorial material is backed by pieces of sandpaper so that it sticks easily on the flannelboard.

Demonstration Kits and Packaged Courses

Audio-visual aids and written materials can be planned together to teach a whole system of ideas and skills. Together they can be packaged into a course or a demonstration kit. For example, a packaged course on cooperative education may in one convenient kit include a guide to the teacher about the use of the kit and how the various instructional aids in the kit could be used together for a particular instructional objective or separately for fulfilling smaller instructional objectives. It may also include reading material both for the teacher and the learners. It may include some posters and charts on cooperative needs and cooperative structure in the area. It may include a set of flash cards or a filmstrip on managing cooperative unions or credit unions. It may include a recording of the President's speech on the need of cooperatives in the agricultural sector if any progress had to be made at all in the country. Lastly, a film may be included to show the working of a successful cooperative in the country, depicting their success story.

Community Resources

In the preceding discussion we have not included a discussion of the film, the radio and the press. They are important audio-visual aids but they are also important sources of community information and most communities today have some kind of services available in this area, however meagre. Adult educators especially those brought up in the verbal tradition act as if these important sources of communication do not exist.

Special effort should, therefore, be made to ensure that these community resources are used. Their use would not come about somehow ! In fact, if adults are left to themselves to listen to the radio or see a film seldom are these media used for education. Entertainment takes over. The newspaper may rarely be touched.

It may be stated as a fairly correct generalization that the community resources of information can be used as educational tools only in a group situation. To use a film for educational purposes or to use the radio for instructional ends or to use the newspaper at all, the adult educator must create discussion groups with suitably trained monitors to conduct these discussion groups. It is not possible within the scope of this paper to include a discussion on how to create, run and maintain such discussion groups. The reader is referred to one of the many books available on the topic.

IV

MATERIALS FOR TEACHERS

There are two views on how much the teacher should be helped

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with his job. One school believes in the minimum. Not only do they talk of the teacher's freedom but also of the unlikelihood of his using the materials given to him. Generally these objections come from people who have fuzzy ideas about teaching and training.

The other group says: Programme the teacher. By this they mean to say that we should anticipate every possible bit of the teacher behaviour and tell him to do each bit. This school, naturally, when writing a 50-page primer for the adult learners, also writes a 50-page teacher's guide. In a functional literacy programme that implements a new concept and where the primer assumes a fairly advanced vocational knowledge a detailed guidebook that helps both (a) on the linguistic, and (b) the vocational content of the primer seems essential.

Teachers' Newsletter

A rather useful item of materials for teachers would be a teachers' newsletter. Training, however adequate, is never complete. A well planned monthly or fortnightly newsletter can deal with instructional problems as they arise, provide the teachers with a forum for discussion, provide needed stimulation, and last but not least, give teachers the feeling of being part of the team.

Materials of instruction are the means through which a functional literacy project will be actualized. Materials would provide the confrontation between the learners and the teachers and change agents. Fortunately educational technology today has prepared educators well for this confrontation. Dreams can be realized, national destinies can be made.

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How to Accomplish School Reform[1]

K. G. Saiyidain

The author argues that school reform is concerned both with the deeper purposes of education as well as its means, and is not a mere tinkering with curricula, tools and techniques. It should be envisaged as a continuous and coherent process involving a multipurpose approach towards the total education of personality. The author then discusses the role of the teacher, the administrator, the community, and experimental institutions in originating and implementing reform, and pleads for an education informed by the values of humanism, love and compassion.

It is, indeed, a great pleasure and privilege for me to be invited to address this imaginatively designed World Conference on Education. I do not know why this honour has been bestowed on me and doubt whether I can at all come up to your expectations. However, all that is possible in a situation like this is to try and do one's best. I am grateful to the conference for this invitation, which affords me an opportunity to meet so many distinguished educationists.

I may say, at the outset, that I do not propose to use difficult impressive, technical terms in my speech. This is not merely an attempt to cover up possible lack of scholarship but is also meant to ensure that I can make quite clear what I have to say. I belong to the rather old-fashioned school of thought which believes that intelligibility is a necessary function of speech and lucidity is desirable in writing—not so much for the sake of the specialists, whom one may be addressing at the moment, but for others who are not specialists but have a general interest in educational problems. As teachers, administrators, researchers, policy makers, we will do well to remember that education is basically of interest to everyone—students, teachers, parents, citizens, civil servants, businessmen, politicians, priests, and others. It derives its purposes and its social significance, its content and methods from this wide variety of social groups and it cannot strike healthy roots in the soil unless it becomes responsive, within reason, to the interests and expectations of all of them. This capacity to communicate lucidly, which is important for all of us, is of special significance for teachers who have to put across knowledge and ideas to their students all the time.

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[1] Address delivered at the Seventh Plenary Session of the World Education Conference at Asilomar, California.

The theme of this plenary session, "How to accomplish school reform", has a place of crucial significance in this conference. When we have analysed the kind of man that we wish to educate and the kind of world which will be a worthy habitation for him; when we have studied the patterns of education round the globe and considered whether or not our present schools are able to meet the new challenges, and how they can be adjusted to new social situations, and how the physical and social environment can become an active ally in the pursuit of worth-while goals—when we have done all this, we will have to face, as educators, the billion dollar question: How can we build a bridge between what-is and what-might-be? How can reform be actually introduced in school systems, which will enable us, within a reasonable period of time, to implement the decisions and conclusions that we may reach in the various other plenary sessions? And, since the conditions and priorities in various parts of the world are so different it is not possible, in a conference like this, to lay down an itemized blueprint of specific reforms, what are the important principles that should guide us in selecting points of significance in this programme? Specific reforms, which are integrally related to each individual school situation, must, of course, remain primarily the concern of the faculty, with help from other relevant sources.

I need not take your time in analysing and clarifying the various terms that are used in discussing the process of reform. Partly because, to my way of thinking, far too much time and attention are given to such analysis—just sharpening our instruments, as it were, instead of attacking the problem. There are few teachers who do not know broadly what terms like 'reform', 'change', 'innovation', 'curriculum development', 'programmed learning', 'new technology', etc., mean. They are all meant to symbolize the kind of changes which will enable the schools and teachers to achieve their objectives more fully and adequately. You may introduce change—by whatever name you call it—and it may not make any impact on the quality of education. On the other hand, a change in the curriculum or methods of teaching or administration might open new windows in the mind and heart of students, might make the work of school teachers more active and joyous, or might reduce the headaches of the administrators. A change by itself is not necessarily for the better, but many teachers try to salve their conscience by making some alterations in their practices in the hope that they will prove the beginning of a fruitful programme of reform. We have tried many new educational experiments in India—as others have done in their countries—only to find that the net result has often been rather disappointing. We must discover the reasons responsible for such failure.

What does school reform include? When it fails, is it a failure of implementation or of imagination and vision? One would be inclined to say that it is both, and the respective importance of the two would depend on *what* we are trying to achieve through it. If it is a change in the curriculum and methods, with which we are primarily concerned, it is the mechanics of implementation that are at fault. If, on the other hand, we are interested more in the re-interpretation of the deeper purposes of education and we fail to bring it about, then obviously it is failure of our vision. But any educator, with a proper understanding of his role, should be concerned with the whole process—neither mere instruction, nor mere training of the mind but the education of the child's *whole* personality, which would cover curricula, methods, understanding of values and purposes and the vital play of social institutions on the school. The school must become, in this enlarged context, not merely the transmitter of the existing pattern or patterns of culture but also in a modest way, a creator of new values and a new pattern of culture. It should take upon itself the difficult but essential function of appraising existing culture, strengthening trends that are life-giving and fighting against forces which repress freedom and the urges of humanism. I am convinced that purposes are of basic importance in education and they must be defined with care, imagination and a spirit of humanism—that is, not with reference to padagogical considerations of a narrow, technical nature or in a kind of academic vacuum, but with reference to the needs and creative aspirations of life, both individual and of the community.

All this cannot be achieved at once. School reform should, therefore, be envisaged as a continuous and coherent process which involves a multipurpose approach towards the total education of personality. It would be necessary, of course, to pick out priorities for action, at particular points of time and in relation to the special circumstances of the school as a matter of tactics. But the teachers should have before them, as a body, a total picture of what they are trying to achieve. It is the comprehensiveness of the envisaged objective that is important, not the simultaneous implementation of the whole programme in view. Sometimes, it happens that one candle lights another and the educational mansion is eventually lighted up as a whole. I remember, for instance, a large high school in Bombay—large according to Indian standards—which I was invited to visit when I was Educational Adviser to the Bombay Government. A distinctive feature of the school, I was told, was its insistence on a high standard of neatness in all written work, from the lowest form to the highest. After looking at hundreds of exercise books in all subjects, I found that the claim was fully justified. This, by itself, was not a remarkable achievement—the remarkable thing was the 'carry over' of this successful tradition in many other fields of work. I do not want to discuss here the moot psychological question whether 'transfer of training' does actually take place. I am only concerned to point out that, as a result of this distinctive feature, students acquired a new sense of pride in their school; their sense of neatness and system in work spread into other activities and the school gradually acquired the reputation of being one of the very good schools in the city. I asked the Principal how they managed to instil this attitude to work in the new pupils admitted. She said, "This has been the least of our problems. Once you have established a tradition firmly, a large majority of the newcomers easily fall into it. If some of them do not do so, the public opinion of the students is able to bring them into conformity without any 'official' pressure being exercised."

Obviously, the starting point for any effective improvement in schools must be an outstanding individual assisted by a group—even a small one—of committed and dedicated teachers, willing to work cooperatively for a commonly cherished goal. The kingpin in this process is often a dynamic and imaginative head of the institution who can provide inspiring leadership for his colleagues and knit them into a genuine team. How are such teachers, you may ask, to become available for pioneering, trail-blazing experiments? In this country, where hundreds of fascinating experiments have been tried out, you should know better than I how to mobilize the best talent for the purpose. I can only point out that there is no *single,* magical recipe for it Sometimes it is a single individual of drive and vision—like Tagore or Zakir Husain in our country—who provides the attraction. Sometimes, it is a dedicated group of progressive teachers who initiate the experiment and draw others into it. However, it would be unfair and unreasonable to expect that, even the best of teachers wil continue to work in a pioneering experiment indefinitely, unless the local or national educational authorities provide reasonably good conditions of work for them and society shows some appreciation of what they are doing. I confess, I have come across a few such persons—both in my country and abroad—who have done very fine, creative work without due recognition, and the joy of it has carried them over the discouraging obstacles till they have broken their way into success and recognition. But these have been exceptions and I would be reluctant to generalize on the basis of their performance. The provision of *congenial conditions* of work must be regarded as a *sine qua non* of reform.

In many countries, where conditions of scarcity prevail, teachers often work in remote rural areas where there are few stimulating contacts, official or non-official, no books, no educational journals, little audio-visual equipment, and the environing community is largely uneducated. The intellectual depression and isolation, which is the normal lot of such teachers, tends to make even the most promising of them lose their interest, and the rest become part of a lifeless routine. Under such conditions, it becomes very difficult to initiate any crea-

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tive experiment. And yet, if they were left out, it would mean that experimentation would be confined to large cities and centres of urban population only. The business of the imaginative educational leader is to leaven the whole mass in course of time, and not to concentrate entirely on institutions and regions which have a favourable climate for the purpose. My stress is on 'entirely,' for I do recognize that, to begin with, he may have to try new ideas and methods where they have a good chance of striking roots in the soil. But the other areas cannot be ignored. They have to be assisted so that they may also become favourable soil for the purpose. To achieve this object, we have tried some measures in India—with limited success, I must confess—for example, improving the efficiency of the teacher training colleges so as to equip the teachers better professionally for their work sending specially prepared literature in the form of brochures, folders, educational journals, etc., to schools in such areas in order to awaken and maintain the teachers' interest in educational change, to arrange visits by good teachers and educationists from other schools who may come into intimate personal contact with them. It may thus be possible to break through their apathy and isolation and let the wavelength of new-ideas take the comparatively backward schools within its purview.

Educational reform, however, is an uphill task. It entails many disappointments, failures and frustrations and, therefore, it is necessary to devise ways and means of keeping up the morale of those working in different kinds of schools—where the educational atmosphere is congenial and where it is not, where the community is co-operative and where it may be indifferent or even hostile. We have to provide imaginative leadership, and administrators and supervisors with sympathy and vision, who will visit them frequently, encourage them to discuss their difficulties, suggest to them readings which will both instruct and inspire and thus break down loneliness wherever it exists. In many of the countries in our part of the world, this is a very serious hindrance, particularly in rural areas, in the professional growth of teachers. Similarly, it is necessary to ensure the involvement of the community in any serious programme of school reform. There was a time when teachers and educational authorities could afford to regard themselves as the sole arbiters of educational policy and measures, but they must now take into account both the adults and the youth of the community. The need for this involvement arises because all educational reform must ultimately rest on a careful and well-balanced assessment of the educational needs and social aspirations of society. It cannot be engineered, as I said, in a social vacuum.

Those needs, broadly speaking, are of two kinds. There are some needs which are basic to man as man, which stem from the very roots of human nature, from man's proper understanding of what the dignity of man implies, from his common urges, aspirations, feelings and passions. Whether one lives in America or Russia or China or India or Arabia or Chile or New Zealand, there are many things which people share and which education must take into account. There are other needs which are closely related to particular cultural or political systems or geographical areas. A comprehensive analysis and understanding of these dual needs is necessary in order to formulate suitable curricula and syllabuses for any particular society. It may be that, in the construction of the curriculum or the syllabus, the specialized needs of a country may come first in point of *time* but, as I see it, priority in *significant* must be given to the *common* needs and aspirations of man as a citizen of the world. To take a small illustrative example: Hundreds of millions of children all over the globe are taught their geography upside down—they are shown as residents of a village or a city, then of a particular district, of a state or province, of a country and, on the periphery, is the world as a fact of somewhat minor significance? This was *never* a sensible approach; in the world today, with its rapid means of communication and interplanetary travel, it has become a meaningless approach. Why should not all our students realize, from the earliest stage of their education, that they are citizens of the world and only, thereafter, the citizens of country, the residents of a state or a district, or a village, so that their loyalties may be rightly oriented from the outset?

In the reconstruction of the curriculum a great deal of work has been going on all over the world. All that one can do here is to lay down general principles of policy to guide the process. This has, to my way of thinking, two components. First, what can we do to streamline the traditional subjects, coordinate them with one another and with life, so that they may be quickened into life and not remain what they have been over the centuries—passive stockpiles of information, some useful, a good deal outdated ? Perhaps many of the progressive, pioneering educators assembled here may not quite agree with this assessment of the present situation of the school curricula. But persons like me, who have worked at the ground level and seen the conditions that prevail, will agree that this is true of a majority of schools all over the world. The other component derives from the fact that our world is changing very, very fast; new knowledge is being created at a pace that staggers the imagination. My scientist friends tell me that science more than doubles in a decade. New technology is being developed continuously, creating new problems not only in its own field but also in social and economic relationships. This is, of course, happening at different speeds in different parts of the world but, slow or fast, the movement *is* in that direction. The crucial point of this unprecedented change, from the educational point of view, lies in the creation of many changed socio-economic relationships and the new problems that arise out of them. If the school ignores these live problems and school reform is not concerned with them, it will cease to have relevance to the world in which we are living. Thus technological progress in the more advanced countries has not only increased their material resources enormously and given man infinitely greater power over Nature; it has also opened out bottomless pits for wasting it destructively. The most obvious example of this, of course, is the criminal and suicidal race in nuclear armaments. This, added to uncontrolled unplanned industrialization, is making the human environment more and more uncongenial and harmful to the life of man—through the pollution of air and water, which, in some countries, has now almost passed beyond the limits of human tolerance, through the growth of soulless metropolis and cosmopolis of enormous size, in which millions of nameless, faceless human beings congregate, who have forgotten what normal community life meant in the past and who have little contact with Nature from which all healthy life springs; through the depletion of the countryside, which is being gradually sucked in by the growing urban menace. These and many other pressures and unhealthy factors, operating in modern life, have raised new problems of frustration, psychological tension, nervous breakdowns amongst the youths and the adults of the community, accompanied by a pitiable desire to seek unworthy forms of escape. There is, consequently, a tendency now to reject the good as well as the bad features of modern civilization. All these problems clamour, often unheard, for the attention of parents, educationists and educational administrators. To the extent possible, they should be worked into the curriculum so that the new generation, emerging out of schools and colleges, will not grow up ignorant of what awaits them in the world of tomorrow or the day after, and they will be in a position to strengthen healthy public opinion on these issues. This will obviously involve throwing out of the curriculum much old cargo and replacing it with new one relevant to the present needs. We can only do so if we carefully examine what we can leave out without serious detriment and what we should include in order to adjust the students creatively to their environment.

"Many interesting ideas and suggestions have been thrown out in this connection by American educationists: the need for what has been called 'strategic simplification' in order to meet the situation created by the recent 'explosion of knowledge' and the growing complexity of life; the need for selectivity and the establishment of priorities; a recognition that all knowledge is not really worthwhile from the point of view of the child in school, that much of it can be eliminated without any damage to education if we could overcome traditionalism and resist inertia, that the approach in the reconstruction of the curriculum should be creative, illumined by insight into purpose, and not merely additive, just adding new material to placate pressure groups or enthusiastic specialists or transient public whims."[2] But that is not all. There is no earthly way in which all, or even the most salient features, of the new knowledge in its most elementary form, could be sneaked into the curriculum of students. The emphasis has, therefore, to shift from mere accumulation of knowledge against a rainy examination day, to learning how to acquire knowledge as it becomes necessary, from how to stuff the memory with information to how to train and develop intelligence and use it for interpreting knowledge. The cultivation of a lively curiosity, the eagerness to learn, the mind trained as a precision instrument are thus seen to be much more important than quantitative learning, and method as more important than content—particularly if it consists of passive information and 'inert' ideas. So one of the most important functions of good teachers, working to bring about school reforms, is to raise questions, to set the mind wondering, to create opportunities in which the students may use the knowledge acquired for solving their own as well as the problems of others.

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[2] K.G. Saiyidain, *The Faith of an Educationist*, Asia Publishing House, Bombay, 1965.

In the educational systems of many countries including the U.S.A., and India, there is often a confusion of priorities in the sense that means are given more importance than ends. No school reform, that is wedded to the shapening of tools, the improvement of methods and techniques, the devising of new teaching aids and apparatus, to the neglect of the basic objectives, in whose service these tools are to be used, is really worth while. While I recognize the importance of the controversy over methods and curricula which goes on in all countries, I am convinced that purposes are of basic importance in education and, unless they are defined with care and imagination and in a spirit of humanism, the mere improvement of means cannot bring about a healthy, far-reaching revolution. And they should be defined not with reference to pedagogical considerations of a technical nature or in a kind of academic vacuum, but with reference to the needs and creative aspirations of life—life which includes both the individual and the community. They should be viewed in the light of the kind of individual we want to educate and the kind of society we wish to bring into being. If I may be permitted to say so, I have found in many educationally progressive and affluent centuries, too much of a tendency to concentrate on means. Not that their best educational thinkers are unconcerned about the basic objectives and purposes but, when it comes to the devising of measures for actual school reform, the emphasis shifts to the sharpening of tools. It is idle to expect that, by doing with greater technical skill and expertise what we have been doing in the past, however inconsequential or of marginal significance, any fundamental reforms could be brought about! Do not the requirements of efficiency, competitive-success-at-any-price, developing the toughness necessary for the purpose and the gospel of what a person owes to the 'first person singular' receive greater attention than cultivating humanism, compassion, self-restraint, self-criticism and the gentler virtues that have been preached and practised by many of the great saints and sages, thinkers and philosophers, poets and writers and men and women of God generally, throughout the course of history? Unless we define our educational objectives more intelligently, more relevantly and in more humane and universal terms and relate our means and techniques to them integrally, all our wonderful machines and streamlined methods will be of little value. It is one of America's great humanists, Norman Cousins, who has said: "Education—the good education, that is—can (and should) help you to move out beyond the narrow confines of the ego, so that you can identify yourself sympathetically—no, the word is not strong enough—identify yourself *compassionately* with the main stream of humanity."

But this cannot be achieved, as I have hinted, by merely tinkering with the curriculum or the methods of teaching, by introducing from time to time more science or new mathematics or more foreign languages in response to some immediate needs. Or even by making radical changes in them, unless they are intelligently related to the longer-range objectives of education.

I have stressed this point in order to make it clear that, for me, school reform has no limited, purely technical connotation. Subject to this proviso, I recognize the importance of developing new techniques for education at all levels—activity methods of teaching and learning, improved audio-visual techniques, new devices of communication like Radio, T.V., films, use of computors, new language learning devices, new ways of designing curricula so as to break down artificial barriers between various school subjects and show their relevance and relationship to contemporary life and the urges struggling to emerge out of it. One advantage of some of these devices is that they make it possible to utilize outstanding teachers—whose number is, alas, limited in all countries—for a much larger student audience than has been traditionally possible, and thus to improve both the quality of teaching and educational productivity. All the potentialities of these media have not been fully explored and, whenever financial and other requisite facilities are available, it would be necessary to make fuller and more effective use of them.

It has, however, to be remembered that the development of these media is at different stages in the various countries of the world. It depends not only on the countries, economic position but is also related to their cultural and social conditions, the stage of their educational development and the part that machines play in their general economy. In some countries, it will have to be done on a very economic basis, minimizing the use of mechanical and electrically run devices and using local resources as much as possible. In rich and educationally advanced countries, these new devices have made considerable headway and it is perhaps not necessary to stress here the importance of their use. However, I would like respectfully to suggest that, even if some countries have the resources to achieve the point of saturation, there would be wisdom in *not* trying to do so. It is possible to make the educational machinery—how shall I put it?—so machine ridden that there will be little scope for initiative and resourcefulness on the part of teachers, and the whole educational process will become a preplanned, rigidly directed, unchallenging routine. In our economically underdeveloped region, we have found that, while lack of resources is a great handicap in doing many things that we want to do, there is also a certain thrill and creative joy in working within the limitation of a scarcity economy and achieving worth-while results, often using human ingenuity and resourcefulness to make do in place of mechanical devices and large financial resources.

We have to bear another caution in mind in the use of the various kinds of teaching machines and devices. In our preoccupation with them, we must remember that a most important aspect of our work is to make a deeper study of the psychology of child-learning—that is, what happens when, in a classroom situation, teachers and students actually confront one another. Teaching apparatus, simple or sophisticated, may help but we have to bear in mind that real education is what goes on between two persons—contact of a mind with a mind, of a spirit with a spirit. This psychological understanding is "an essential component of any strategy designed to raise performance level in education. Indeed, without a better knowledge of this process, an attempt to introduce new technological systems could have a dehumanizing effect on education." This useful warning has been given to the modern generation of teachers in the Fifth Annual Review of the Economic Council of Canada.

In many countries of the East, there has been traditionally an intimate, personal relationship of great significance betwen the Guru, i.e., the teacher and his students, whether one or many. This was in the past often a one-to-one relationship in which the student would become a member of the Guru's family, live with him for several years, serve him with devotion, acquire knowledge at his feet and receive education not only from books and through formal lessons but from the impact of the Guru's personality, his sense of values, his philosophy of life. This practice is, of course, not possible now and we, in the East, may have overdone it. But, in a process of educational improvement, we shall ignore its real significance at our peril. A good deal of the present student unrest in many countries, so far as it is due to academic causes, stems from a growing mechanization of the teacher-student relationship in the schools, the colleges and the universities. When actual teaching is relegated to junior assistants and lectures and the professors and other senior members of the faculty remain largely preoccupied with their research and research publications —the students often remain for them a nameless, faceless crowd. This not only undermines the personal influence which the teachers could have exercised over them, but also provides some justification for their protest movements. A 'depersonalization' of relationship is bad in *all* human associations; in education, it is particularly out of place.

In an appraisal of what a healthy society requires, we must learn to distinguish between what it *wants* and what it *needs*. An individual, a group or a society may want many things—bigger cars, more cigarettes; more cosmetics, more drugs, more armaments—and, therefore, call for the training of the younger generation in producing these articles efficiently. Now, it is *not* our business as teachers to accept necessarily what the customer decides he wants. If we were purveyors of ordinary consumer goods, there might be some justification for letting the consumer decide that point. But education does *not* belong to that category and it cannot be left to the uneducated whim of Everyman! We must make a comprehensive and socially sensitive survey of his real *needs* and adjust education accordingly. I am not, let me make it clear, advocating that an authoritarian regime should decide the total pattern of education and the particular niche in which each individual is to be fitted. I am entirely opposed to such an approach. In the formulation of educational objectives and policies, enlightened non-official public opinion as well as the government should both be involved and there should be an open public discussion of the issues. At the implementation level, there is need for close cooperation and consultation between the teachers and the local community.

In order to initiate a well-thought-out, long-range programme of school reform, it is necessary to work out designs of pioneering educational experiments and organize experimental institutions where new approaches to curricula, syllabi and methods of teaching may be tried out—schools like the Dewey School in Chicago, the Tagore School in Bengal, the Zakir Husain School at the Jamia Millia in Delhi, Vasconcello's New School in Belgium, and the Oundle Public School in England. I have named a few schools at random and there are many more pioneering schools in most countries of the world. One of the most difficult things in improving schools is to fight against the rigid traditionalism, the *status quo* mind, the timid adherence to routine which characterizes the normal run of teachers all over the world. They resist, they are conditioned to resist, change and this is true in spite of all that one hears of the changes coming over the educational systems. In the U.S., when the 8-year study experiment was being tried out and teachers were told that they were free to work out new ideas, many of them frankly confessed, at least in the early stages, that they were 'frightened of freedom'. In my own country, desirable changes often remain confined mainly to certain progressive schools, while the majority bow their heads, as it were before the storm and "let the thundering legions past" ! Even of a great university like Cambridge, it has been said, by one of its distinguished teachers, that it takes about 25 years for any important measure of reform to go through the various consultative committees and authorities concerned and by that time it becomes out of date and it is time to think of another ! This may be an epigrammatic way of putting it but it does show that changes do not come about easily in the educational world.

When I speak of changes, I am not, incidentally, referring to trivial changes but those which are significant and require a re-patterning of teachers' basic attitudes and the cultivation of new insights on their part. So far as superficial changes are concerned, any self-complacent administrator can issue an order and take the unction to his soul that the changes prescribed have been carried out, if the teachers go through certain motion of doing things. Further, the teaching faculty should not be lulled into complacency just by introducing certain changes in the school programme. It is *not* the change that is important but its reaction on the children and the youth. Has it succeeded in giving them a clearer view of the world in which they are living, in learning better ways of dealing with new situations, academic and social, that they may come across, in integrating their knowledge into their life? The teachers should be sensitively observant of the *effect* of the changes on the students' mind and personality and, as a faculty, they should work to develop ways of measuring and assessing their impact. Otherwise, the change may deceive not only the administrator, but even the teachers themselves, into believing that its purpose has been achieved. It is unwise to imagine that anything really worth while can be accomplished either easily or quickly. In effecting educational reform, teachers have to be actively involved at all stages—planning at the macro and micro level, assessing the draft plans, working out effective techniques of work and, finally, in the actual process of implementation. They should not be treated only as part of the implementing machinery. This does not mean that *every* teacher is capable of making a valuable contribution at all these stages but it will be good for them to have the feeling that they are, or can become, active partners in the process, that they have the requisite opportunity, if they will care to make use of it.

What would be the right methodology and approach to reform in the educational system? As I see it there are two ways of initiating it. One can either impose such reform from above or outside—imposition by government, by political groups, by the education department authorities, by the parents, or even by the students, the new phenomenon that has developed recently. This is by no means the best approach because if I may so put it, its centre of gravity falls outside the base of support. The motivation is not the teacher's who is the main agent in the process but of various other social groups. They are all, of course, involved in the process but naturally they have their own special purposes to promote. We cannot rule out this approach altogether; it has its limited usefulness, particularly in special circumstances; for instance, when the teaching faculty is passive or indifferent, or there are important matters of policy which require a certain measure of national consensus which can only be arranged under the auspices of the government, or the pressure of the local community is needed to make the teachers conscious of its special needs. Provided the teachers gradually acquire the capacity to welcome and actively support all healthy currents of thought and opinion coming from outside and also the courage to resist whatever is obscurantist or narrow-minded in them. I know this is a difficult condition to impose but without courageous and discerning teachers, no worth-while changes can be introduced. If we think such teachers will not be forthcoming at all, we might as well give up the effort!

The alternative approach is to make the teachers the starting point of reform, and through training, refresher courses, stimulating contacts and participation in experiments enthuse them with new ideas and practices and improve their competence and understanding of educational purposes. In this case, the results are likely to be more abiding and rewarding. Through such a process reform strikes its roots deep in the educational soil and does not need constant goading from outside. It becomes self-directed.

Does that mean that these other agencies to which I have referred have no important role to play? No, they have a vital role but it is mainly concerned with the creation of favourable conditions in which teachers can work with maximum efficiency. The supervisors and administrators must provide for proper *freedom, creativity* and *initiative;* the department should help schools to organize experiments to arrange effective *clearing houses* for information and ideas. Again, all of them can show in their respective ways due *appreciation* of good work wherever it is done. An easy enough thing to do in all conscience but I have often found educational authorities niggardly even in this matter! A good man and good worker is God's greatest gift. To honour him is to honour ourselves, our common humanity. And there are many ways in which befitting public recognition can be accorded. In India, for instance, every year the President of the Republic gives national awards to one hundred outstanding teachers from primary and secondary schools. Finally, it is the joint responsibility of all these agencies to provide necessary funds for the purpose and see to it that no really good work is allowed to languish or suffer for want of funds. While educational authorities all over the world complain that they do not have as much resources as they need, affluent nations can hardly realize how in many countries with scarcity economies education has to subsist on a shoestring budget. Money is essential and if this is recognized it can be spared from other comparatively less important or wasteful heads of expenditure. *Provided* we do not forget that it cannot by itself improve education. In the final analysis, it is the men and women of ability, imagination, goodwill and social conscience who can do so.

When we have passed through the stage of trying out new and creative methods of education successfully in selected schools, the next problem will be to put them across to hundreds of thousands of schools and give millions of children their benefit. Here the pressure of quantity is always apt to defeat quality and, in the process of transmission, the new approaches become excessively watered down. However, there are some precautions which may help in the successful transfer of experience from the selected schools. First, arrangements should be made for the regular visits of teachers from ordinary schools to these schools to observe their functioning, to work in cooperation with their teachers, prepare necessary curricular and illustrative material, and study methods of more lively presentation of significant life-related contents. Occasionally, gifted teachers from these schools should visit ordinary schools in their neighbourhood and give the benefit of their experience and new insights to their colleagues. We tried out, in India, with Ford Foundation assistance a fairly well articulated scheme under which the primary and secondary teachers training colleges were made responsible for the academic supervision and betterment of schools in their neighbourhood. They were given some additional staff and library and conveyance facilities for the purpose, and programmes were drawn up which made a two-way traffic possible between them. The success of the experiment varied from area to area, depending on the quality of the college faculty and the response of the schools but, on the whole, it was a worth-while venture. At this stage, it is necessary, I repeat, to make sure that there is active cooperation and understanding amongst the students, the parents, the teachers, the supervisors and the administrators so that they may all pull in the same direction and not work at cross-purposes, Great patience, goodwill, devotion, enthusiasm and wisdom are needed to overcome the obstacles that will necessarily come in the way. The schools should also have the freedom, if they can exercise it, to adjust the experiment to their own special conditions, instead of following the given pattern mechanically. Honest differences of opinion should never be ruled out nor the initiative of the men on the spot, curtailed: What is, however, inexcusable is *pretending* to believe in an experiment or a method or idea and not *really* believing in it. Gandhi once said in the socio-political context: "The highest honour that my friends can do me is to enforce in their life the programme that I stand for or to *resist me to their utmost if they do not believe in it.*" This cannot, of course, be applied rigidly over the whole area of education, where there is a definite place for system, and a free-for-all situation may conceivably lead to educational chaos. But Gandhi's remark enshrines a truth which it would be unwise to ignore. There must be room in all significant creative activity for dissent and a readiness on the part of the majority or the concerned authorities to give it due consideration. In many of the countries, with which I happen to be familiar, there is too much of the strait-jacket approach which kills creativity and restricts freedom. And no radical school reform is possible if teachers are denied creativity and freedom. Many more teachers are capable of growing into fine teachers, if given the necessary conditions of work than the administrators are usually prepared to recognize. It is undesirable to have any prison walls in the educational system which only persons of exceptional vision—a Dewey, a Tagore or a Homer Lane—are sometimes able to break through. We should have a built-in possibility of *every* teacher, with the necessary ability and enthusiasm, being able to make a contribution.

This brings me to the last point which I wish to place before you. School reform to my thinking, is something even more than a a matter of designing a lively and meaningful curriculum, of working out new methods of teaching and developing an alert and sensitive mind. It also involves the question of cultivating, in the students, attitudes and ideals which we consider worthy and whose significance they can appreciate. This is not merely the age-old question of training the intellect as well as character—that has always been with us and is part of the warp and woof of all education. I am thinking of the *special* qualities necessary here and now in order to ensure the survival of man with dignity in his new and challenging and heart-breaking environment. How I shall define and specify these qualities? Perhaps I can do so best by saying that they belong to the values—area of love, with which are associated charity, compassion, social sensitivity, urge for peace. Without this supreme quality of love, life can have no savour, man can build no worth-while culture and the teacher has no great purpose to work for. All true progress, a French writer has remarked, is progress in charity, everything else being secondary to it. This is precisely the quality which is in short supply in the world today—in spite of the impressive advances that we have made in the social services and, to some extent, in the field of international assistance.

Can the school make any contribution to this situation? Perhaps many of the hard headed, worldly wise, cash-and-carry minded teachers and administrators may say: 'No, what has the school got to do with it?' I would submit, in all humility, that a school system which does not concern itself with the question of right attitudes and values, and school reform which passes it by, are nothing but an exercise in futility or worse, and those, who disregard this basic question, do not really know what they are talking about. School reform must aim at bringing about a reorientation of teachers' minds, emotions and values, and, through them, produce a revolution in the thinking and feeling of students so that they learn to value creative happiness over possessive happiness, cooperation above competitive success, service above exploitation; so that they learn to realize that all men are brothers and no human being should be a stranger to another, that their weal and woe are one and inseparable. Their separateness is a mirage, their unity a deep-rooted spiritual entity. In the words of one of our great philosophers Dr. Radhakrishnan, "God is the human bond that unites all human beings. To break this bond even with our worst enemy is to tear God Himself to pieces"! Again, our teachers must realize that teaching is an art which calls for infinite patience born of a true love for children. A child is God's greatest gift and, in the oft-quoted words of Tagore, "every child brings the message that God is not yet disappointed in men". But the fulfilment of God's hope depends on what the parents, teachers and society can help the child to become, through their personal example, their training, their curricular offerings, and the openings provided for his self-fulfilment. The contemporary world offers the child numerous opportunities as well as numerous risks. From an early age, he has to be trained to seize opportunities of fulfilment and to recognise the signs of danger. The latter cannot be entirely or perhaps even partially eliminated. The world is too much with us—with its violence and fanaticism, its irresistible media of mass propaganda, its heart-rending juxtaposition of riches and poverty, its numerous injustices, its temptation to seek success and money in easy and unscrupulous ways. We cannot, and should not, try even if it were possible to guard the students from *knowing* about them by keeping them in an ivory tower for that would make their transition from the world of school to the outside world more difficult and risky. There is certainly the danger that, in this approach, some adolescents may stray away from what we consider the path of reason, sanity and decency and fall under undesirable influences. The teacher is not God who can guarantee against that possibility; even God, so far I can judge, does not do so. But the danger will be greater if the students were kept in cotton wool and did not see the world as it is but only through the beautiful and deceptive hues of the rainbow. But, as I have said, it is essential for the teacher to cultivate love and patience—love to save him and themselves from frustration and pessimism, and patience to enable him to continue serving the student, however unresponsive or unattractive a particular individual may be, and however trying the circumstances in which he has to work—controlling his anger, his heartaches, his headaches and the attacks of cynicism to which he may quite conceivably be exposed.

I do not know how far, strictly speaking, these few verses, which I quote, from one of our great poets, Iqbal, are relevant here. They are taken from a long poem of his, called "the Mosque of Cordova", one of the most exquisite poems I have read. Its theme is that, in this transitory, mortal world, only those things abide, which are wrought on the anvil of love and, if I may venture to say so, education—especially of young children—which is not shaped on this anvil can never irradiate life's garden.

"Only to vanish arise all the miracles of Art,
All in this world passes away—all in the world passes away!

Death the beginning and end—death for the hid and the visible;
The pattern may be old or new, death is the journey's end!
"Yet, in this transient world, some works unending abide—
Works wrought by men of God into perception's grace!
The work of such men glows with the radiance of love;
Love, which is the well-spring of life, Love to which death itself
is forbidden.
Though swiftly and violently rolls the flood of time
Love itself is a flood which can stem all oncoming waves.
In love's calendared scroll is written not merely the passing
present
But other ages too—ages that have no name!

"Love is the breadth of Gabrel, love is the prophets' heart,
Love the messenger of God, love the voice of God!
Under love's ecstasy glows brighter our mortal clay,
Love is the unripe wine, love the beautiful cup!
Love is the priest of the shrine, love the commander of the hearts
Love is the wayfarer, with its thousand habitations
Love is the singer plucking song from the chords of life
Love is the brightness of life, love is the fire of life."

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Establishing Validity of Self-Concept Measures

Pratibha Deo
Harbhajan Singh

The authors report a study conducted to establish the validity of self-concept measures. Two new concepts of validity (Convergent and Discriminant) were used, and the tools were Deo's (1963) Personality Word List (PWL), Self-Concept List (SCL) based on Deo's PWL, and Teachers' Rating. The investigators found the validity for these three measures of self-concept to be quite satisfactory.

One's actions and achievements in life are bound to be largely determined by what one feels and thinks of himself. In the realm of human abilities the conception of self is of far reaching significance. Under- or over-evaluation of self can indeed be tragic. Proper appraisal of one's own capabilities is essential to a happy and useful life. The self is also central in the learning process. Quite intelligibly the emphasis has now tended to shift on the self as a variable in motivation. It becomes evident that the self must also be accepted as a problem of perception. Self-concept, though essentially private, influences, and is revealed by most of a person's behaviour. It has been found that persons with good self-concepts are less anxious, are judged to be generally better-adjusted, are more effective in groups, and more honest in themselves and less defensive. A currently popular hypothesis is that human behaviour in any particular context is largely determined by one's perceptions of oneself and of one's situation. It has been realised that psychology which excludes the self cannot fully understand human behaviour.

In recent years psychologists have undertaken extensive empirical research on the self-concept and its assessment. Out of the research three main aspects of self have been taken into consideration. These aspects are: (i) Perceived self, (ii) Ideal self, and (iii). Real self. The perceived self is what we think we are, the ideal self is what we would like to be, and the real self is what we actually are. All these three aspects of the self are important in understanding the behaviour of an individual.

As we have just seen the importance of the study of the self, another question or problem arises: How will we study it? Here we face the problem of choosing the best instrument, and not only that, but how well it satisfies our needs by some absolute standard. This is in fact the problem of establishing validity of self-concept measures, and hence its need and importance. Problems of measuring the phenomenal field may be seen as those of establishing construct validity. Construct validity is necessary because self-concept theories explicitly require that we measure a stated class of variables, the subjects' conscious processes.

Concepts of Convergent and Discriminant Validity as Aspects of Trait (Construct) Validity

Campbell (1959) emphasized that the validity of a proposed trait or construct (such as Social Introversion) should be carefully studied to see if the trait is distinguishable from other traits and whether two or more measures of the trait (by independent methods) tend to agree.

In studies of both concurrent and predictive validity, fairly high correlation coefficients representing agreement or convergence, were sought as evidence of validity. However the construct validity of a test (as a measure of a hypothesized trait) requires evidence of both convergent and discriminant validity.

A test of a trait should show convergent validity, that is, fairly high correlations with other tests of the same trait and with measures of behaviour that should be associated with it.

A test of a trait should also show discriminant validity, that is, low correlations with tests from which it is supposed to differ.

Campbell (1959) recommends the use of the Multi-trait Multi-method Matrix as an ideal approach in studying the construct validity of a new test or rating scale. In the present study, both the aspects (convergent and discriminant) of construct (personality) validity have been employed.

SAMPLE

The sample of one hundred B.Ed. students was taken from the Government College of Education, Chandigarh. They were selected randomly for the study. The sample was taken from both sexes and while selecting the sample, the age variable was controlled. Students from 18 years to 25 years of age were included in the sample. The sample was limited to only 100 subjects, due to the fact that the scoring part of the study was the most difficult task.

TEST MATERIALS

The materials used in the present investigation are as follows.

Personality Word List (PWL)

The adjective check list was used here, because the adjective check lists prepared by Gough and Sarbin (1952) have proved useful in finding out the discrepancy between perceived and ideal self on the lines of Sarbin's Word List (1952). Deo (1965) prepared a Personality Word List (PWL) of 210 adjectives and has carried out certain useful investigations (1964, 1965, 1966) in which this list has been used. For the present investigation the same PWL was used.

Self-Concept List (SCL)

For the subject's convenience in understanding adjectives in the personality word list (PWL) of Deo, the self-concept list (SCL) was developed by Deo and Walia (1966). This list contains 175 adjectives mostly drawn from Deo's Personality Word List. The adjectives have been put in statement forms both in Hindi and English so that they become easy to understand.

Teacher's Rating

For obtaining scores on real self teacher's rating was employed as the criterion measure. The teacher's rating about the self of the students was taken on three point scale on Deo's PWL.

PROCEDURE

For recording the data both for perceived and ideal self, the recording sheets of the Self-concept List (SCL) and Personality Word List (PWL) were used. On these sheets the subjects marked statements and adjectives on a three-point scale.

After getting data on SCL and PWL, the teacher's rating about student's self on PWL was also taken.

Scoring

The adjectives in the PWL were categorized into six dimensions of Personality by Bhalla (1968). These dimensions are: (i) Intelligence, (ii) Emotional Adjustment, (iii) Social Adjustment, (iv) Character, (v) Aesthetic, (vi) Neutral. Similarly, adjectives in the SCL were categorized into the same six dimensions of Personality (as named above) by Deo and Walia (1966).

Scoring Keys

The recording sheets of PWL and SCL were scored with specially prepared keys. There are two types of keys—positive and negative. The positive keys are meant for those words or traits which are socially desirable as they have been judged by taking the ratings of many judges. The negative keys are meant for those words or traits which are socially undesirable, again as have been judged by many judges. These keys were meant to score for all the six dimensions of personality in case of both PWL and SCL. These keys are prepared on blank recording sheets by punching out their correct parts.

Discrepancy Scores

After finding positive and negative scores with the help of scoring keys, the composite scores were calculated. The composite scores are those scores which are obtained by subtracting negative scores from the positive scores.

The total discrepancy scores between the perceived self and the ideal self (termed as self-acceptance) were worked out by subtracting the total composite scores on the perceived self from the total composite scores on the ideal self. In the same way total discrepancy scores between the perceived and the real self (termed as self-insight) were calculated.

ANALYSIS OF DATA AND RESULTS

The data based on PWL, SCL and Teacher's Rating was processed statistically by using the following techniques:

Frequency Distributions,
Means, Standard Deviations, Skewness and Kurtosis,
Frequency Polygons,
Correlations.

From frequency distributions the following results were obtained.

TABLE

	Mean	*SD*	*SK*	*KU*
1. Frequency Distribution of total scores for Perceived Self on PWL	47·15	12·30	1.52	·246
2. Frequency Distribution of total scores for Ideal Self on PWL	49·55	11·90	1 28	·258
3. Frequency Distribution of total scores for Perceived Self on SCL	45·05	10·75	1·15	·272
4. Frequency Distribution of total scores for Ideal Self on SCL	47·60	11·50	1·68	·248
5. Frequency Distribution of total scores for Real Self on PWL	42·80	8.60	–.61	·272
6. Frequency Distribution of total discrepancy scores between Perceived and Real Self on PWL	10·34	4 10	– ·60	·315
7. Frequency Distribution of total discrepancy scores between Perceived and Ideal Self on PWL	8·82	3.44	– 1·88	·170

From the results of Mean, Standard Deviation, Skewness and Kurtosis, it is clear that they show a trend of normalcy, showing that the distributions obtained were nearly normal.

Correlations

The results obtained for the Convergent and Discriminant validities were presented diagramatically as given below.

Convergent (on SCL and PWL) and Discriminant (on PWL) Validities for Perceived Self

	Intelligence	*Emotional Adjustment*	*Social adjustment*	*Character*	*Aesthetic*	*Neutral*
Intelligence	.65					
Emotional Adjustment	.57	.69				
Social Adjustment	.67	.55	.80			
Character	.45	.41	.46	.89		
Aesthetic	.43	.31	.37	.18	.73	
Neutral	.14	.12	.06	.14	– .12	.22

Convergent Validity (on SCL and PWL) for Ideal Self and Discriminant Validity (on SCL) for Perceived Self

	Intelligence	*Emotional Adjustment*	*Social adjustment*	*Character*	*Aesthetic*	*Neutral*
Intelligence	.58					
Emotional Adjustment	.64	.61				
Social Adjustment	.56	.61	.61			
Character	.52	.36	.53	.85		
Aesthetic	.35	.22	.41	.22	.58	
Neutral	.04	.012	.06	.10	– .02	.29

Results of Correlations for Real Self on PWL

The correlations worked out between perceived-real discrepancy scores and perceived-ideal discrepancy scores are as below.

Dimension	*Correlations*
Intelligence	·47
Emotional Adjustment	·42
Social Adjustment	·55
Character	·66
Aesthetic	·26
Neutral	·03

DISCUSSION

From the Frequency Distributions it is evident that three groups, namely: (i) those who underestimate, (ii) those who over-estimate, and (iii) those who have average self-estimation, are formed. As compared to the average self-estimation group, there are few subjects who over-estimate themselves, and from those who underestimate themselves, a larger number have a tendency towards average self-estimation. Again, from the polygons similar results were drawn.

Convergent Validity

From the coefficients of correlation obtained in case of the perceived self on all the six dimensions of personality and on the total scores of PWL and SCL, all but one are significant at .01 level as seen from Garrett (1958). The one which is not significant at .01 level is significant at .05 level. The value of correlation significant at .05 level was for the neutral dimension. Similar results have been obtained in the case of the ideal self.

It may, therefore, be seen that the correlations obtained between the scores of the same dimensions of personality on PWL and SCL in the case of the perceived and the ideal self are quite significant. Thereby we may conclude that both the instruments (PWL and SCL) measure that thing for which they were intended.

Discriminant Validity

Intercorrelations were obtained for the six dimensions of Personality on the perceived self on PWL. From these correlations, it may be seen that except in the case of neutral, and in some cases of aesthetic, the value of correlation is significant at .01 level. This means that all these dimensions have high correlations among themselves. Thus the validity of PWL seems to be high. Similarly, the values of the intercorrelations regarding the perceived self on SCL show the high validity of SCL.

Teacher's Rating

The values of correlations obtained for personality dimensions of intelligence and emotional adjustment were significant at .05 level and for social adjustment and character the value is significant at .01 level. And for aesthetic, neutral and total scores, the values of correlations were not significant. It is clear from these results that the person, who is intelligent, is emotionally and socially adjusted and has a good character, is likely to have self-insight and self-acceptance.

CONCLUSIONS

We may draw the following conclusions regarding the present investigation:

1. From the frequency distributions and frequency polygons it is clearly seen that as compared to the average self-estimation group there are only a few cases who fall at the two extremes of the distributions (curves); a larger number of persons fall at the centre of the distributions (curves). Thus the distributions (curves) are approximately normal.
2. Correlations obtained in case of convergent validity for perceived and ideal self are significantly high for all the dimensions of personality except in some cases of neutral dimension. Thus the convergent validity as reported is quite high.
3. Correlations obtained in case of discriminant validity for the perceived self on PWL and SCL are significantly high for all the dimensions of personality except in case of neutral and, in some cases, of aesthetic dimensions. Thus

the discriminant validity as reported is high.

4. Correlations obtained for real self on teacher's rating have also been reported significantly high. Thus it means that the teacher's rating is also a good measure for the personality estimation of the students.

Finally, we may conclude that the validity of self measures, viz., PWL and SCL and Teacher's Rating, is significantly high, thereby establishing the validity of the self-concept measures.

REFERENCES

Anastasi, Anne. *Psychological Testing.* New York :The MacMillan Co., 1968.

Bhalla, S. L. Unpublished Ph.D. Thesis, Panjab University, Chandigarh, 1968.

Campbell, D. T. and Fisk, D. W. Convergent and Discriminant Validation by Multi-trait Multi-Method Matrix. *Psychological Bulletin,* Vol. 56, 1959, 81-105.

Deo, Pratibha. Assessment of self-concept. Paper read at Research Workshop on Educational Evaluation held at Panjab University, Chandigarh, in February 1964.

Deo, Pratibha. A study of self-concepts of University students in Panjab. *Psychological Studies,* Vol. 10, 1965.

Deo, Pratibha and Walia, D.K. *Self-Concept List.* April 1966.

Garrett, H.E. *Statistics in Psychology and Education.* New York: Longman, Green and Co., 1958.

Gough, H. G. *The Adjective Check List.* University of California, Berkeley, 1952.

Guildord, J. P. *Fundamental Statistics in Psychology and Education.* New York: McGraw Hill Book Co., Inc., 1956.

Ruth, C. Wylie. *The Self-Concept.* Lincoln: University of Nebraska Press, 1961.

Sarbin, T. R. A preface to a psychological analysis of the self. *Psychological Review,* 1952, .59: 11-22.

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Effectiveness of Four Response Modes in Programmed Learning—An Exploration

Gunvant B. Shah

The author reports a study undertaken to compare experimentally the efficacies of four different modes of responding in programmed learning. A sample of 188 pupils of Standard VIII was taken from two secondary schools in Baroda city and Shah's programme on Addition and Subtraction of Directed Numbers was given separately to the pupils of the two schools. The pupils responded either overtly or covertly. Each group was further divided into a group making constructed responses and a group reading the frames with answers already filled in. Significant differences were found on the immediate test scores of the four treatment groups, but not on the retention scores. The covert response prompt group showed an appreciable time-saving.

Skinner has described learning in terms of shaping of behaviour. His behaviourist point of view requires the learner to make an active, overt response. Holland (1960) suggested eight basic rules for programming with reference to the Skinnerian technique. The present inquiry is primarily concerned with the following two of them:

1. Only overt responses suitably reinforced are learned.
2. The students must 'write' the programme.

Both these rules are associated with Skinner's theory of learning. Skinner wishes to eliminate all non-observable factors from the learning situation although he does not deny their existence. Skinner further. asserts that the student should compose his response rather than select it from a set of alternatives. Classical operant conditioning assumes that the responses must be overt and not covert in order to have 'expressed behaviour' which can be observed, recorded, and used to regulate subsequent behaviour.

As with the other original assumptions, that of the necessity of overt responses is being challenged by research. Experiments have shown that an overt response need not in fact always be made. Campbell (1961) studied the effectiveness of the following four conditions:

1. Subjects write in the response only when sure of its correctness.
2. Subjects write answers in every blank.
3. Subjects do not write answers but mentally compose answers.
4. Subjects read the same frames with no words omitted—no blanks to fill.

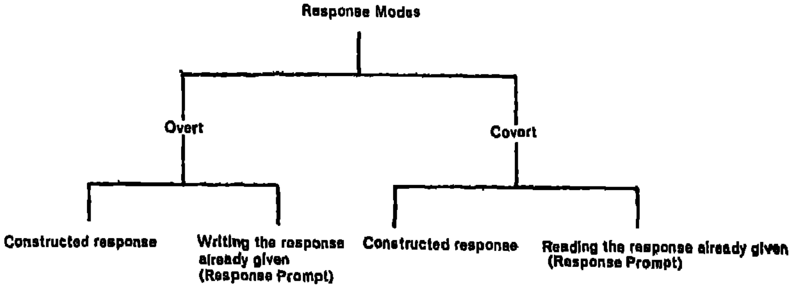
He found that on immediate post-test there was no significant difference among the means of the four groups. Ten weeks later, condition (4) was better than others at 0.05 level. The expectation that condition (1) would make for more learning and same time was not supported. Condition (1) resulted in fewer errors, but these did not show up in learning effect.

Cummings and Goldstein (1962) inquired into the effectiveness of overt vs. covert responding on the learning of verbal and of pictorial material. Significantly higher scores were made by the overt responders on both the verbal and pictorial materials and on both the immediate and the delayed post-tests. The covert responders took an average of 50 minutes to complete the programme; the overt responders, about 96 minutes.

Evans (1960) found that students not required to make overt response to items, completed programme in about 65 per cent of time required by overt responding students. Goldbeck and Campbell (1962) compared overt, covert, and reading (i.e., no blanks to fill in) response models. He found significant interaction of difficulty with response mode. He found the overt response group performing below others at low difficulty level and above others at intermediate difficulty level. At the most difficult level, the reading mode was highest, but not significantly so. Hughes (1961) compared the covert response mode with the overt response mode while following up '7070 Training' and found that the covert response mode was more efficient than the overt. Koromondy (1960) found no significant differences between the overt and the covert response modes. Lambert and Miller (1962) found that intelligence was significantly associated with the amount of information acquired from the programme. Covert responses proved to require less time than overt ones and to result in about as much learning. Sidowski and Kopstein (1961) found that the covert response proved more efficient than the overt if both the time and amount of learning were taken into account. Silverman and Alter (1960) found that students who simply read items learned significantly more than students who read items and responded actively. Stolurow and Walker (1962) found no significant difference between learning from writing responses and merely thinking them. Covert responses required less time than overt. Leith and Ghuman (1966) found no significant differences between the four treatments selected for the present inquiry. They noted that there was an appreciable Response-mode Answer interaction—the covert constructed response mode being significantly better than the overt constructed response mode, while the two answer groups were not different.

PURPOSE

It was intended to compare experimentally the relative efficacies of the four response modes described below.


Response Modes
Overt
Covert
Constructed response
Writing the response already given (Response Prompt)
Constructed response
Reading the response already given (Response Prompt)

TERMS DEFINED

For the purposes of the present inquiry the following definitions were used.

1. *Overt response.* A student's oral, written or manipulative act which is, or can be recorded by an observer.
2. *Covert response.* An internalized response which the student presumably makes but which is neither recorded nor otherwise available to an observer.
3. *Constructed response.* A student's effort to complete a sentence, solve a problem or answer a question. A model of the response may be provided for the student to copy, but as long as he writes, says or thinks rather than selecting it from a set of alternatives the response is constructed.
4. *Response prompt.* A method of responding in which the correct responses are already given in the frame. A student either reads the responses given or copies them out after reading.
5. *Effectiveness.* The effectiveness of a response mode would be considered in view of the following three criteria:
   (i) Performance on the criterion test immediately given after the programme.
   (ii) Average time taken by the treatment group.
   (iii) Retention score.

THE EXPERIMENT

Subjects

The subjects were 188 pupils of Standard VIII in two English-medium schools of the city of Baroda.

Materials

Shah's programme on Addition and Subtraction of Directed Numbers was used in this experiment. The programme contains 95 frames written in a linear style. Four versions of the programme were prepared to suit the four treatments described below. The test comprising of 10 multiple-choice type and 10 fill-in-the-blanks type items was used as a criterion measure.

Experimental Treatments

The treatments consisted of four different response modes of the programme in algebra as mentioned below:

A—Overt-Answer not Given
B—Overt-Answer Given (Response prompt)
C—Covert-Answer not Given
D—Covert-Answer Given (Response prompt)

A description of the treatments is given below.

A—Overt-Answer not Given. The pupils constructed responses and wrote them before ascertaining whether they were correct. They were instructed to write the answers in a separate answer sheet provided. The correct answers were provided on the left-hand side of the margin and could be read after removing the paper which covered them.

B—Overt-Answer Given. The pupils wrote the answers which were already given in the blanks. They were instructed to read a frame carefully along with the answer and write the answer given in the blank(s), in a separate answer sheet provided.

C—Covert-Answer not Given. The pupils constructed responses mentally before ascertaining whether they were correct. They were instructed to think of the correct answers and then ascertain whether they were correct by removing the paper on the left-hand side of the margin.

D—Covert-Answer Given. The pupils read the responses which were already given in the blanks. They were instructed to just read the frames carefully along with the correct answers already provided.

PROCEDURE

First Phase

The experiment was conducted separately in the two schools of the city of Baroda. The available samples of 84 subjects in one school and 104 in the other were randomly assigned to the four treatment groups. All subjects were instructed to go according to their own speed and the time taken by each subject was noted in order to set the average time taken by each treatment group. The criterion test was immediately administered after all the members of a group had completed the programme. In all the four groups the oral instructions for the programme as also for the criterion test were given by the same person. The programme was administered in two sessions with a break of 25 minutes.

Second Phase

The criterion test was readministered to the same subjects to measure delayed retention. It was readministered after five days to 84 subjects in one of the two schools and after 15 days to 104 subjects in the other. Retention scores of the four treatment groups were compared. Further, the four groups were also compared in terms of percentage saved.

Third Phase

The effectiveness of a response mode was also judged in terms of the time taken by the four treatment groups. The time taken by an individual pupil was noted down to calculate the average time taken by each group.

Statistical comparisons were made on the following three criteria:

1. Scores in the criterion test given immediately after the programme administration.
2. Scores on the delayed retention test given after some days.
3. Average time taken by the four treatment groups in completing the programme.

RESULTS

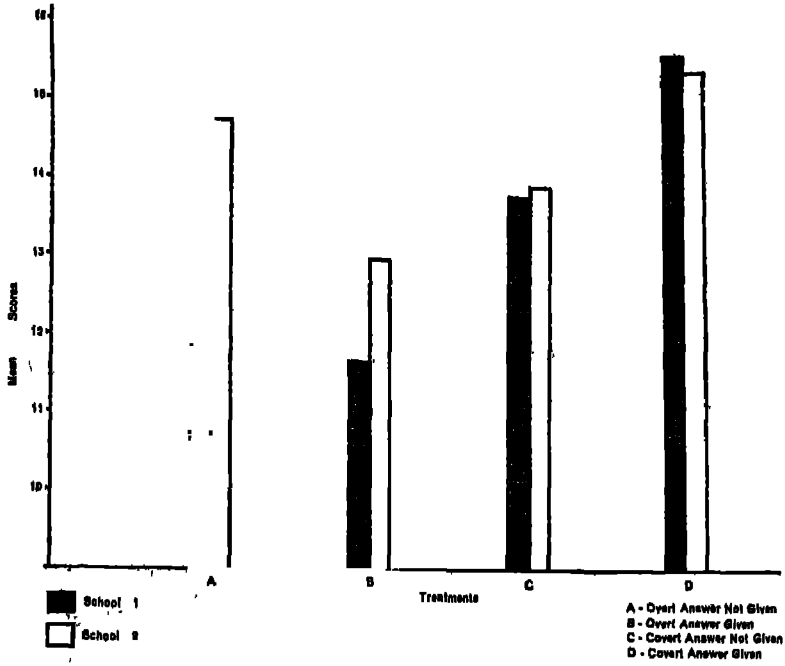
First Phase

In this phase, differences between the treatment groups on the immediate test scores are discussed.

TABLE 1

Mean Scores of Subjects In Four Treatment Groups on Immediate Test Scores in Schools I and II

School		*A Overt Answer not Given*	*B Overt Answer Given*	*C Covert Answer not Given*	*D Covert Answer Given*
I	$\bar{X}$	14·8	11·6	13·7	15·5
	n	21	21	21	21
II	$\bar{X}$	14·7	12·9	13·8	15·3
	n	26	26	26	26



Graph I. Graph showing mean scores of four treatment groups on immediate test (Schools I and II)

TABLE 2

Analysis of Variance of the Immediate Test Scores For The Four Treatments (School I)

Source of Variation	*df*	*S. S.*	*M. S.*	F	*Significance*
Among the Means of Treatments	3	182·8	60·93	7·59	Significant at ·01 level
Within Groups	80	641·7	8·02		

Analysis of variance does not tell us which one treatment is different from the other. In such cases we have to resort to t-test or some other derived techniques. The Least Significant Difference (LSD) Test is one such technique using a pooled error variance (MSW or within-group variance) computed in analysis of variance technique. The formula for LSD is:

$$\text{LSD} = \sqrt{\frac{2\text{MSW}}{n}}$$

Where MSW=Within groups variance

n=Number of observations per mean to be compared

$$\text{LSD at } 5\% = t.05 \times \sqrt{\frac{2\text{MSW}}{n}} = 1.99 \times \sqrt{\frac{2(8{\cdot}02)}{21}} = 1{\cdot}73$$

$$\text{LSD at } 1\% = t.01 \times \sqrt{\frac{2\text{MSW}}{n}} = 2{\cdot}64 \times \sqrt{\frac{2(8{\cdot}02)}{21}} = 2{\cdot}29$$

TABLE 3

Significance of Difference Between Means of Any Two Treatments (School I)

Treatments	*Difference between Means*	*Significance*
A & B	3·2	Significant at ·01 level
A & C	1·1	Not significant
A & D	0·7	Not significant
B & C	2·1	Significant at ·05 level
B & D	3·9	Significant at ·01 level
C & D	1·8	Significant at ·05 level

TABLE 4

Analysis of Variance of the Immediate Test Scores For the Four Treatments (School II)

Source of Variation	*df*	*S. S.*	*M. S.*	*F*	*Significance*
Among the Means of Treatments	3	88·96	29·65	4·36	Significant at ·01 level
Within groups	100	679·93	6·79		

$$\text{LSD at } 5\% = t_{\cdot 05} \times \sqrt{\frac{2\text{MSW}}{n}} = 1{\cdot}98 \times \sqrt{\frac{2(6{\cdot}79)}{26}} = 1{\cdot}89$$

$$\text{LSD at } 1\% = t_{\cdot 01} \times \sqrt{\frac{2\text{MSW}}{n}} = 2{\cdot}63 \times \sqrt{\frac{2(6{\cdot}79)}{26}} = 1.42$$

TABLE 5

Significance of Difference Between Means of Any Two Treatments (School II)

Treatments	*Difference Between Means*	*Significance*
A & B	1·9	Significant at ·01 level
A & C	0·9	Not significant
A & D	0·6	Not significant
B & C	0·9	Not significant
B & D	2·4	Significant at ·01 level
C & D	1·5	Significant at ·05 level

Observations (First Phase)

1. It can be seen that the overall differences between the treatment means are significant at .01 level in both the schools (Tables 2 and 4).

2. The results on LSD test in both the schools seem to be very consistent with only one exception of treatments B and C.

3. The mean scores of the four treatment groups in both the schools show perfect rank correlation. In both the schools the four treatments could be arranged according to merit in the following order.

First	D—Covert-Answer given (Response prompt)
Second	A—Overt-Answer not given
Third	C—Covert-Answer not given
Fourth	B—Overt-Answer given (Response prompt)

Second Phase

In this phase, the differences between treatment groups on retention test scores are discussed. The four treatments are also compared on the retention scores in terms of saving.

TABLE 6

Mean Scores of Subjects in Four Treatment Groups on Delayed Retention Test Scores in School I and II

School		*A Overt Answer not Given*	*B Overt Answer Given*	*C Covert Answer not Given*	*D Covert Answer Given*
I	$\overline{X}$	12·2	12·3	11·6	10·5
	n	21	21	21	21
II	$\overline{X}$	12·1	13·00	12·2	12·7
	n	26	26	26	26

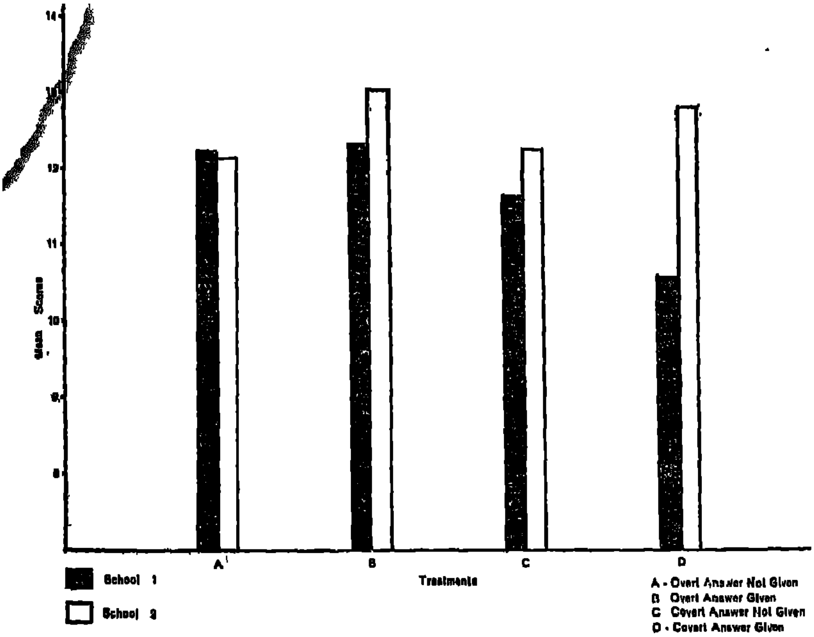
TABLE 7

Analysis of Variance of the Retention Test Scores for the Four Treatments (School I)

Source of Variation	*df*	*S. S.*	*M. S.*	*F*	*Significant*
Among the Means of Treatments	3	41·28	13·76	1·44	Not significant
Within Groups	80	764	9·55		

$$\text{LSD at } 5\% = \text{t. } {\cdot}05 \times \frac{2\text{MSW}}{\text{n}} = 1{\cdot}99 \times \sqrt{\frac{2(9{\cdot}55)}{21}} = 1{\cdot}89$$

$$\text{LSD at } 1\% = \text{t. } {\cdot}01 \times \frac{2\text{MSW}}{\text{n}} = 2{\cdot}64 \times \sqrt{\frac{2(9{\cdot}55)}{21}} = 2\ 50$$



Graph 2. Graph showing mean scores of four treatment groups on retention test (Schools I and II)

TABLE 8

Significance of Difference Between Mean Retention Scores of Any Two Treatments (School I)

Treatments	*Difference Between Means*	*Significance*
A & B	0·1	Not significant
A & C	0·6	Not significant
A & D	1·7	Not significant
B & C	0·7	Not significant
B & D	1·8	Not significant
C & D	1·1	Not significant

TABLE 9

Analysis of Variance of the Retention Scores for the Four Treatments (School II)

Source of Variation	*df*	*S. S.*	*M. S.*	*F*	*Significant*
Among the Means of Treatments	3	18 5	6·16	1·00	Not significant
Within Groups	100	614	6·14		

$$\text{LSD at } 5\% = t.\ {\cdot}05 \times \sqrt{\frac{2\text{MSW}}{n}} = 1{\cdot}98 \times \sqrt{\frac{2(6{\cdot}14)}{26}} = 1{\cdot}37$$

$$\text{LSD at } 1\% = t.\ {\cdot}01 \times \sqrt{\frac{2\text{MSW}}{n}} = 2{\cdot}64 \times \sqrt{\frac{2(6{\cdot}14)}{26}} = 1{\cdot}81$$

TABLE 10

Significance of Difference Between Mean Retention Scores of Any Two Treatments (School II)

Treatments	*Difference Between Means*	*Significance*
A & B	0·9	Not significant
A & C	1·1	Not significant
A & D	0·6	Not significant
B & C	0·2	Not significant
B & C	0·3	Not significant
C & D	0·5	Not significant

TABLE 11

Comparison of Four Treatments on Retention in Terms of Saving (School I)

ores on Test	*Mean Scores on Retention Test*	*Percentage Saved*	*Rank in Terms of Saving*
	12·2	82·4	III
	12·3	100	I
	11·6	84·6	II
	10·5	67·7	IV

TABLE 12

Comparison of Four Treatments on Retention in Terms of Saving (School II)

Treatments	*Mean Scores on Immediate Test*	*Mean Scores on Retention Test*	*Percentage Saved*	*Rank in Terms of Saving*
A	14·7	12·1	82·3	IV
B	12·9	13·0	100	I
C	13·8	12·2	88·4	II
D	15·3	12·7	83·0	III

Observations (Second Phase)

1. It can be seen that the overall differences between the treatment means are not significant at any level in both the schools (Tables 7 and 8).

2. The results of LSD test in both the schools seem to be quite consistent as the differences between any two treatments are not significant.

3. In school I, the retention test was given after five days, while in School II after 15 days. In both the schools the four treatments could be arranged according to merit in the following order.

	School I	*School II*
First	B	C
Second	A	B
Third	C	D
Fourth	D	A

As the differences between the means are not significant it can be said that the four treatments are almost equally effective as far as retention is concerned.

4. As regards the amount saved, it can be seen from Tables 11 and 12 that treatment B seems to be most effective and treatment C comes next. It should be noted that in both the schools the retention scores with treatment B are little higher than the immediate test scores.

This can be accounted for by possible reminiscence. Treatment D seems to be the least effective in School I but not quite so in School II. less time-consuming than overt.

Third Phase

In this phase, the effectiveness of a treatment was judged in terms of the average time taken by the subjects.

TABLE 13

Ranks of The Four Treatments According to the Average Time Taken in Schools I and II

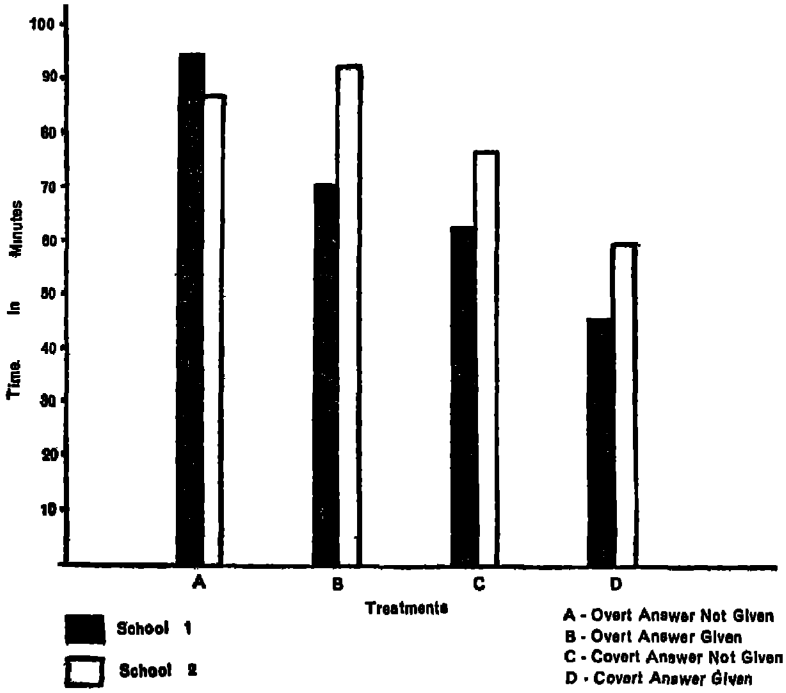
Treatment	*Time Taken in Minutes School I*	*Time Taken in Minutes School II*	*Ranks School I*	*Ranks School II*
A	94	87	IV	III
B	70	92	III	IV
C	62	76	II	II
D	45	59	I	I

Observations

1. Treatment D (Covert-answer given) seems to be least time-consuming in both the schools.
2. Treatment C (Covert-answer not given) comes next to D.
3. In any case covert responding appears to be comparatively less time-consuming than overt.

DISCUSSION

The results of the experiment are not in conformity with the two basic rules suggested by Holland. As mentioned earlier, Holland



Graph 3. Graph showing average time taken by four treatment groups (Schools I and II)

(1960) asserts that only overt responses suitably reinforced are learned and that the students must 'write' the programme. The results have shown that covert responding is at least as effective, if not more, as overt responding from the viewpoint both of immediate and delayed test scores. Furthermore, it is time-saving too. Leith and Guhman (1966) asserted that "being aware of the answer before making a try does not necessarily lead to poorer learning." The results of the present experiment support this contention.

It should be noted that treatment D (covert answer given) which required the pupils to just read the frames proved to be most effective both in terms of immediate test scores and the time taken. Skinner's emphasis on overt and active responses does not seem to be tenable after surveying the results of many experiments, including the present one.

The fact that covert responding in the response prompt mode (answers already given in the frames) is quite effective, has many implications in Indian context. It is often alleged that programmes prove to be costly. Experts advocate the use of the separate answer sheet in order to bring down the cost of a programme. The covert response prompt mode does not even require the answer sheet. It is known that programmes written or printed in the Skinnerian style require many pages because of the big margins provided for correct responses. These margins would become redundant when the students are required to just read the frames with correct responses already filled in. Such a practice would make the programmed learning material somewhat less expensive, both space-wise and time-wise, without any loss of effectiveness whatsoever.

It seems reasonable that the use of programmed materials holds promise for improving instruction especially in developing countries of Asia. This implies that every effort must be brought to bear upon the problem of making them effective and, at the same time, economical.

REFERENCES

Campbell, Vincent N. *Adjusting Self-Instruction Programs to Individual Differences: Studies of Cueing, Responding, and Bypassing.* San Makeo, California: American Institute for Research, 1961.

Cummings, Allana and Goldstein, Leo S. *The Effect of Overt and Covert Responding on Two Kinds of Learning Tasks.* New York: The Centre for Programmed Instruction, 1962. (mimeo.)

Evans, James L. An Investigation of "Teaching Machine" Variables Using Learning Programs in Symbolic Logic. Doctor's dissertation, University of Pittsburgh, 1960, quoted in *The Research on Programmed Learning* by W. Schramm, published by U.S. Department of Health, Education and Welfare, Washington, 1964.

Goldbeck, Robert A. and Campbell, Vincent N. The Effects of Response Mode and Response Difficulty on Programmed Learning. *Journal of Educational Psychology,* 53, 1962.

Holland, James. Quoted in *Teaching Machines and Programmed Instruction* by Fry, Edward, B. McGraw. Hill Book Company, Inc., New York, 1963.

Hughes, John L. *Programmed Instruction:..A Follow-up Study of 7070 Training.* New York: International Business Machines Corporation, 1961.

Koromondy, E.J. Oberlin Experiments in Self Instruction in General Zoology: Preliminary Analysis. Cited in *Automated Teaching: A Review of Theory and Research.* Robert E. Silverman. (Port Washington, N.Y: U.S. Naval Training Device Centre, 1960, p. 17.)

Lambert, Philip; Miller, Donald M.; and Wiley, David E. 'Experimental Folklose and Experimentation: The Study of Programmed Learning in the Wanwatosa Public Schools". *Journal of Educational Research,* 55 (1962), 485-94.

Leith, G.O.M. and Guhman, A.S. *The Effects of Prompting and Confirmation on Two Methods of Responding to a Self-Instructional Programme on Coordinate Geometry* (Mimeographed). Research Notes on Programmed Learning, No. 6, National Centre for Programmed Learning, March 1966.

Sidowski, Joseph B.; Kopstein, Felix F.; and Shillestead, Isabel J. Prompting and Confirmation Variables in Verbal Learning. *Psychological Reports-8,* 1961, 401-406

Silverman, Robert E., and Alter, Millicent. Note on the Response in Teaching Machine Programs. *Psychological Reports-7,* 1960, 496.

Stolurow, L.M., and Walker, C.C. A Comparison of Overt and Covert Response in Programmed Learning. *Journal of Educational Research,* 55, 1962, 421-32.

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Self-Acceptance and Academic Achievement— A Review of Research

Sagar Sharma

Studies conducted in the last two decades to establish the relationship between self-acceptance and academic achievement provide contradictory findings. Some report a linear relationship between these two variables and others present a zero relationship, while two studies recently conducted in India provide evidence of a curvilinear relationship. In this paper the author critically examines all these studies and offers suggestions for further research in the area. He also stresses the importance of more cross-cultural research for making reliable generalizations.

The study of personality factors as predictors of academic achievement has claimed the attention of a number of research workers. Some of the relevant research reviews were published by Emme, 1942; Garret, 1949; Beasley, 1957; and Gowan, 1960. All these consistently emphasize the role of non-intellectual factors in the student's performance. The investigations so far undertaken have attempted to focus on a wide variety of personality traits hypothesized as factors of academic achievement, such as extraversion and intraversion, neuroticism, emotional adjustment, socialization, anxiety, achievement motivation, self-concept, etc. The self-concept or phenomenal self as defined in contemporary psychology refers to the individual's perception of himself. In general, researches in the area of self-concept have concerned themselves with the two measures—both considered as measures of self-acceptance. One measure is simply the favourableness of self-perception, i.e., positive and negative self-concept. The other measure of self-acceptance is the discrepancy between the perceived self and the ideal self. McCandless (1961) predicts, "poor self-concepts, implying as they often do a lack of confidence in facing and mastering the environment, might accompany deficiency in one of the most vital of the child's areas of accomplishment—his performance in school." The assumption is that the student with the adequate self-concept, feeling that he can succeed, will put forth the necessary academic effort, whereas the student with inadequate self-concept, feeling that he cannot succeed, will not put forth the necessary academic effort to achieve in school and college. A reasonably good number of studies have been conducted in the last two decades to establish the relationship between self-acceptance and academic achievement. But a careful perusal of these studies reveals contradictory and inconsistent findings.

Evidence of Linear Relationship

One group of studies provides evidence of linear relationship between self-acceptance and academic achievement. In a study conducted on 102 students of fifth and sixth grades by Coopersmith (1959), a correlation of .36 was found between positive self-concept and school achievement when socio-economic status was held constant. Another study was conducted by Walsh (1956) who compared the self-concept of high and low achieving boys, matched for superior IQ and certain other variables. On the Driscoll Playkit, the doll play of the underachievers, when compared to that of adequate achievers, less frequently depicted the boy doll as (a) free to pursue his own interests, (b) free to express his feeling, (c) accepted as a member of the family, and (d) adequate in response to environmental stimuli. It was assumed that these findings indicated differences in their self-concept. Twenty boys from the second through the fifth grade were included in each of the groups. Fink (1962) supported the hypothesis that adequate self-concept is related to high academic achievement and that inadequate self-concept is related to low (under) achievement. The results were significant at the .01 level for boys and at the .1 level for girls. Payne (1962) devised an objective theory-based measure of academic self-concept, the Word Rating List (WRL), for predicting academic achievement. With the exception of underachievers, the WRL provided significant concurrent and predictive r's with grade point averages. Coombs and Davis (1966) reported that *Ss* with high scholastic records had lofty conceptions of their scholastic ability, expected and usually obtained high college grades. Edwards (1966) used an 85—item multiple-choice type questionnaire called the Personal Data Inventory (PDI) to obtain self-rating scores, which were found to be significantly related to the prediction of college success as measured by GPA (Grade point averages) and by college hours completed. Irvin (1967) compared the semester grades with sentence-completion responses of 171 first-year college students. The most notable finding was a positive correlation (r=.48) between self-concept and academic achievement—the correlation was significant at the .01 level. Kerensky (1967) administered the Coopersmith Self-Esteem Inventory to 452 randomly selected elementary pupils in grades three through six. Following one year of Flint's compensatory education programme, the relation between pupil's self-concept and achievement showed a marked increase (.29 to .38) during the first year of new programme. Quimby (1967) used a Q-sort method to measure the relationship between the self-concepts and ideal self-concepts. The students were divided into an achieved group and an underachieved group on the basis of grade-point averages. The self-ideal relationship was higher for the achieved group. The differences were greater among girls than among boys. Blair (1968) studied ninth grade negro students. The self-concept was measured by the Index of Adjustment and Values (IAV) standardized by Bills *et al* (1951). There was a significant relationship between academic achievement of these subjects and their self-concept, independence and inner control. In India, Bhatnagar (1966) also explored the effect of self-concept and ego function on academic achievement, especially in terms of self-acceptance and self-rejection. He showed that a definite relationship existed between the ego function and scholastic performance. Kulwant (1967) reported a correlation of .33 between self-acceptance and achievement (N=190).

Perin Mehta (1968), in a recent study, identified the achievers and underachievers among bright high school males. The self-concept of these two groups was assessed by means of items describing the positive or negative aspects of self-concept. The underachievers were characterized by the negative aspects of self-concept, and the achievers by the positive aspects.

Evidence of Zero Relationship

There are some other studies which report no relationship between self-acceptance and academic achievement. Mitchell (1959) reported that, as a group, the self-rejecting women did as well in school as those who were self-accepting, and did not differ from them in intelligence. Fiedler *et al* (1958) found no relation between self-esteem and grade-point average. Turner and Vanderlippe (1958) obtained only non-significant trends towards higher grade-point averages among *Ss* with high self-ideal congruence. (*Ss* high or low on self-ideal congruence were comparable on ACE test.) Among 251 fourth and sixth grade children used as *Ss* by Perkins (1958), there was no relationship over a six-month period between changes in school achievement and changes in self-ideal congruence. Torrance (1954) reports, "little relationship between self-estimate and achieved standings among 1215 entering college freshmen." Gustav (1962) could not find it possible to differentiate, on the basis of responses to the "Who am I?" Test, among college students who had superior, average, or failing grades. McIntosh (1967) investigated the self-concept of gifted, honours and average college students. Bills IAV was used to obtain self-concept scores. He found that the gifted did not have significantly higher self-concepts than the honours or the average, nor did the honours have significantly high self-concept than the average. In a study by Schaar (1967), participation in different kinds of supportive counselling experiences resulted in differences in five academic achievement groups, but there were no differences found in the changes in self-concept among these sample groups as measured by California Psychological Inventory.

Evidence of Curvilinear Relationship

However, there are two studies by Deo and Sharma (1970 a, 1970b), which report curvilinear relationship between the self-acceptance and school achievement of adolescents (F=338, M=362). The sample was selected from thirteen urban higher secondary schools of four Indian States and was quite heterogeneous. In these studies, the Self-concept Inventory, standardized by Sharma (1969) on the Bills IAV pattern, was used. A single self-concept score was obtained by subtracting the total negative self-concept score from the total positive self-concept score. Similarly, self-ideal discrepancy scores were obtained by calculating word-to-word discrepancies of 69 adjectives between perceived-self ratings and ideal-self ratings on a five-point scales. Both the self-concept scores and self-ideal discrepancy scores were normally distributed. The achievement scores were based on three years' continuous and comprehensive evaluation of students studying under the jurisdiction of Panjab University. The reliability of these achievement scores has already been reported by Sharma (1969). In the first study (Deo and Sharma, 1970 a), the eta-coefficient between self-concept and school achievement was observed to be .18 (N=700), which was significant at the .06 level. The F-test of linearity showed the value of F to be significant at the .06 level. Similarly, in the second study (Deo and Sharma, 1970b), the value of the eta-coefficient between self-ideal discrepancy and school achievement was found to be .20 (N=700), which was significant at the .01 level. The F-test of linearity showed the value of F to be significant at .02 level. Thus it was seen that the middle group (moderately contended) scored significantly higher than both the extreme groups (extremely satisfied and extremely dissatified). This means there are self-acceptant low achievers and self-rejectant low achievers. It would be worthwhile to study the psychological variables which differentiate self-acceptant low achievers from self-rejectant low achievers. No such attempt was made in these studies.

Comments

It is clear from the review of these studies that the findings are contradictory. Some studies report linear relationship; others report no relationship; while the two conducted in India showed a curvilinear relationship between self-acceptance and academic achievement. It is difficult to compare these studies due to the different tools used, the heterogeneity of samples in characteristics like sex, age, ability, religion, class; size of samples; different controls of correlated variables; application of diverse methods of identifying high and low achievers; and different educational and evaluation systems. A number of these studies used very small samples. Another group of studies utilized only the extreme groups and neglected the middle groups on the self-concept and achievement continua. There seems to be no justification of utilizing self-acceptance scores until they are normally distributed, and thus free from the contaminating influence of the social desirability variable, and hence more reliable. There is a need for using large, heterogeneous samples which are very widely scattered on self-concept and achievement continua. The self-concept-achievement curves badly need strengthening at the extremes. Further, the impact of intellectual factors on academic achievements need to be partialled out if one wants to get a clear picture of the effect of non-intellectual factors on achievement. Moreover, the synthesis of these studies becomes more difficult because a wide variety of instruments have been used for inferring self-concept. In a number of cases the reliabilities and validities of these tests are not reported. It will be highly desirable if more limited and well-analysed instruments are used for inferring self-concept to facilitate synthesis of accumulated information. Only one study by Walsh (1956) used a projective test, i.e., the Driscoll Playkit, to infer self-concept. The *Ss* self-concept was assessed from the behaviour and attitudes he attributed to the boy doll. It would have been better if the convergent validity of this projective test had been demonstrated by questioning the boys about their phenomenal self-concepts. Commenting on this test, Wylie (1961) observes:

> Also, the fact that the *E* who administered the play test scored all the stories raises some question of contamination of findings. It seems possible that she might have remembered the sources of some of the stories, even though identifying data had been removed from the protocols before scoring was begun.

Perhaps the use of both phenomenal and non-phenomenal indices of self-concept might be more useful. Moreover, a number of studies used the correlation technique which only speaks of mutual relationships between these two variables. As such cause-effect generalizations cannot be made. Thus the observed correlations might have partly arisen from self-acceptance affecting academic achievement and partly academic achievement affecting the self-acceptance. Further, analysis of variance designs are also called for, because some of the apparent contradictions may be due to the interaction of variables which are yet unexplored in a systematic way by any of the presently available studies. More cross-cultural studies are needed before reliable generalizations could be made.

REFERENCES

Beasley, J. *Underachievement: Review of the Literature.* Talented Youth Project, H.M.L.T. Teachers College, Columbia University, 1957.

Bills, R.E.; Vance, E.L., and McLean, O.S. An index of adjustment and values. *J. Consult. Psychol.,* 1951, *15,* 257-261.

Bhatnagar, K.P. Academic achievement as a function of one's self-concept and ego-functions. *Education and Psychology Review,* 1966, *6,* 178-182.

Blair, G.E. The relationship of selected ego-functions and the academic achievement of Negro-students. *Dissertation Abstracts,* 1968, *28,* (8-A), 3013.

Boshier, R. and Hamid, P.N. Academic success and self-concept. *Psychol. Rep,* 1968, *22,* 1191-1192.

Coombs, R.H. and Davis, V. Self-concept and the relationship between high school and college scholastic achievement. *Sociology and Social Research,* 1966, *50,* 460-471.

Coopersmith, S. A method for determining types of self-esteem. *J. Educ. Psychol.,* 1959, *59,* 87-94.

Deo, P. and Sharma, S. Self-concept and school achievement. *Indian Educational Review,* 1970 a, *5,* 100-105.

Deo, P. and Sharma, S. Self-ideal discrepancy and school achievement. *Adolescence*: Washington, 1970 b, *5,* 19, 353-360.

Edwards, C.M. The prediction of college success with biographical data and self-ratings. *Dissertation Abstracts,* 1966, *27,* (3-A), 599.

Emme, E. Predicting college success. *J. Higher Educ.,* 1942, *13,* 263--267.

Fiedler, F.E., Dodge, S., Jones, R.E., and Hutchens, E.B. Interrelations among measures of personality adjustment in non-clinical population. *J. Abnorm. Soc. Psychol.,* 1958, *56,* 345-351.

Fink, M.B. Self-concept as it related to academic achievement. *Calif. J. Educ. Res.,* 1962, *13,* 57-62.

Gowan, J.C. Factors of achievement in high school and college. *J. Counsell. Psychol.,* 1960, *7,* 2, 91-95.

Garret, H.E. A Review and interpretation of investigations of factors related to scholastic success in colleges of arts, sciences and teachers college. *J. Exp. Educ.,* 1949, *28,* 91-138.

Gustav, A. Comparison of college grades and self-concept. *Psychol. Rep.*, 1962, *11*, 601-602.

Irvin, F.S. Sentence-completion responses and scholastic success or failure. *J. Counsell. Psychol.*, 1967., *14*, 269-271.

Kerensky, V.M. Reported self-concept in relation to academic achievement in an inner city setting. *Dissertation Abstracts*, 1967, *27*, (8-A), 2325.

Kulwant, K. Self-acceptance in relation to achievement and socio-economic status. M. Ed. thesis, Panjab University, 1967.

McCandless, B.R. *Children and Adolescents*, Holt, Rinehart & Winston, Inc., 1961.

McIntosh, D.K. Correlates of self-concept in gifted students. *Dissertation Abstracts*, 1967, *27*, (8-A), 2403.

Mehta, P.H. The self-concept of bright underachieving male high school students. *Indian Educational Review*, 1968, *3*, 81-100.

Mitchell, J.V. Goal-setting behaviour as a function of self-acceptance, over and underachievement, and related personality variables. *J. Educ. Psychol.*, 1959, *50*, 93-104.

Payne, D.A. The concurrent and predictive validity of an objective measure of academic self-concept. *Educ. Psychol. Measmt.*, 1962, *22*, 773-780.

Perkins, H.V. Factors influencing changes in children's self-concepts. *Child Developm.*, 1958, *29*, 221-230.

Quimby, V. Differences in self-ideal relationship of an achieved group and an underachieved group. *Calif. J. Educ. Res.*, 1967, *18*, 23-31.

Schaar, W.G. Changes in academic success and self-concept of low achieving community college freshman. *Dissertation Abstracts*, 1967, *27*, (9-A), 2750.

Sharma, S. Standardization of self-concept inventory. *Psychological Studies*, 1969, *14*, 84-87.

Sharma, S. Reliability of Panjab University higher secondary examination. *Haryana Journal of Education*, 1969, *2*, 49-52.

Torrance, E.P. Rationalization about test performance as a function of self-concepts. *J. Soc. Psychol.*, 1954, *39*, 211-217.

Turner, R.K. and Vanderlippe, R.H. Self-ideal congruence as an index of adjustment. *J. Abnorm. Soc. Psychol.*, 1958, *57*, 202-206.

Walsh, A.M. *Self-concepts of bright boys with learning difficulties.* New York: Bureau of Publications, Teachers College, Columbia University, 1956.

Wylie, R.C. *The self-concept.* University of Nebraska Press, Lincolin, 1961.

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Research on Institutional Environment—A Review[1]

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In recent years a number of researches have been conducted to study the influence of institutional environment on student growth, achievement and output. In this paper the author discusses some of the instruments developed to measure institutional environment, and reviews the significant researches conducted in India and abroad. The author also suggests a research strategy in this area for the Indian educational scene, and lists an extensive bibliography for the interested researcher.

The heredity-environment controversy is as old as the existence of psychology, and studies supporting one point of view or the other are numerous. The consensus is much in the direction of equality of importance of both hereditary and environmental factors in influencing personality growth and development. With the degree of consensus arrived at on the issue, and the complexity and practical impossibility involved in controlling heredity, psychologists in the 1960s have started exploring the environmental characteristics that foster growth and happiness in human life. A majority of these attempts are directed towards the study of school or college environments and industrial climates as they are the two types of organizations with relatively sta-

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ble climates, enabling objectivity in quantification. By now, a number of techniques have been developed to measure college or school environments as well as the organizational climates of industries. The growing sophistication of researches conducted demonstrating the influence of the college environments on student output in terms of the achievement as well as personality characteristics is catching the attention of the educational psychologists. The growth is so rapid that in this decade alone there have emerged not one but a number of instruments to measure institutional environments; and the number of researches conducted run into hundreds. Recently measures of the environmental perceptions are being used also to predict the student unrest in the campuses. Parallel to this is the use of the measurement of organizational climate of industries to predict industrial unrest. Noting the growing student unrest in Campus India, and the way it is spreading like a wild fire among the universities, perhaps it is advisable for Indian educationists to start thinking of various ways and methods of predicting and controlling student unrest, and to start exploring ways and means of creating desirable learning environments in the schools and colleges. Studying objectively the various dimensions of institutional environment and finding out the amount of influence they exert on student development seems to be a worthwhile area of research. In this paper some of the instruments developed to measure institutional environments have been described, followed by a review of some of the researches conducted in India and abroad. Finally, a research strategy in this area for the Indian educational scene has been suggested. An extensive bibliography in this area has been presented for the interested researcher.

MEASUREMENT OF INSTITUTIONAL ENVIRONMENT

Environment is such a vast term that it can include anything and everything. A number of scales have been developed so far to measure the environment of colleges, high schools and other organizations. As we shall see later, some of these instruments, named differently have something in common to measure, whereas some others having something in common in their titles measure altogether different dimensions of the environment. The different instruments that have appeared so far in the literature of educational research are described below:

1. *The College and University Environment Scales*

The College and University Environment Scales or CUES, developed by Pace (1963) containing 150 true-false items to measure campus climates has five scales derived by factor analysis. These are:

1. *Practicality Scale* which tells about the degree to which the environment is structured and orderly, where rules and procedures are important, and where interest in ideas for their own sakes tend to be deemphasized;
2. *Community Scale* which measures the degree to which a warm, cohesive atmosphere is emphasized, and whether there are close relationships between students and faculty and among students.
3. *Awareness Scale* which measures the degree to which interest in philosophy, the arts, and national and international affairs give evidence of personal awareness in relations to society;
4. *Propriety Scale* which measures the degree to which proper forms and conventions are emphasized, good manners are evident, and there tends to be unconventional behaviour, etc.
5. *Scholarship Scale* to measure the degree to which the pursuit of knowledge and ideas and the attainment of scholarly achievement are valued.

2. *High School Characteristics Index*

The High School Characteristics Index or HSCI is another environmental technique developed by Stern (1963) to assess the student's perception of his environment by asking him to respond with either "true" or "false" to items about his school. This yields scores on 30 scales representative of different aspects of "press" in the environment. Mitchell (1968 a) administered HSCI to 2,819 senior class students from 11 schools of a metropolitan area. Factor analysis of the 30 scales yielded the following 4 factors:

1. *Strong Intellectual Orientation*, having high loadings for the

variables of "press" for achievement, ego achievement, energy, humanities and social sciences, reflectiveness, science and understanding.

2. *School Activities*, having high loadings for affiliation, exhibitionism, nurturance and play.
3. *Negative Attitude towards the Environment*, having high loadings of "press" for abasement, adaptability, lack of objectivity and autonomy.
4. *Strong Environmental Control*, having high loadings for deference, deliberation, and order.

A separate factor analysis for 11 schools also showed similar factors. However in some factors 1 and 2 seemed to have merged, which the authors speculated is due to low S-E status leading to general complaints. Other findings of this study suggest that high socio-economic status is certainly no guarantee of an achievement-orientation (Factor 1 high loadings), nor is a weak achievement-orientation an inevitable concomitant of low S-E status of the students in the school. However, S-E status showed significant relationship with factor 2.

3. *Stern's Indices*

Stern, a pioneer researcher in this area has developed a number of indices to measure college and other institutional environments. Besides the High School Characteristics Index, are the Activities Index or AI to measure the activities of the college students; CCI or College Characteristics Index to measure environmental variables (Stern, 1963, 1965); the Organizational Climate Index or OCI (Stern, 1963); and the Evening College Characteristics Index or ECI (Stern, 1961). Of these indices the well-known ones are the AI and CCI. While the AI reflects the student needs, the CCI reflects the environmental "press" of the college and with these instruments and Murray's motivational theories, Stern attempted to study the "need-press" interaction in the American Colleges.

Both CCI and AI consist of 300 yes/no-type items each of which the students are required to answer. The items of CCI refer to specific campus activities like laboratory facilities, athletic programmes, dormitory characteristics, political organizations, course requirements, etc. There are 39 seats of such items. Intercorrelations obtained from 1,076 students of 23 colleges gave the following 11 first-order factors: 1. Aspiration level (consisting of counteraction, change, fantasied achievement, and understanding); 2. Intellectual climate (consisting of reflectiveness, humanities-social sciences, sensuality, understanding, and fantasied achievement); 3. Student dignity (consisting of objectivity, assurance and tolerance); 4. Academic climate (consisting of humanities-social sciences, and science); 5. Academic achievement (consisting of achievement, energy, understanding, counteraction, and conjunctivity); 6. Self-expression (consisting of ego-achievement, emotionality, exhibitionism, and energy); Group life (consisting of affiliation, supplication, nurturance and adaptiveness); 8. Academic organization (consisting of blame avoidance, order, conjunctivity, deliberation, defence and narcissism); 9 Social form (consisting of narcissism, nurturance, adaptiveness, dominance and play); 10. Play (consisting of sexuality, risk-taking, play and impulsiveness); and 11. Vocational climate (consisting of practicalness, puritanism, deference, order and adaptiveness). Two second-order factors merged are on the intellectual-non-intellectual dimensions. The twelve need-factors that emerged out of Activities Index include self-assertion, audacity-timidity, intellectual interests, motivation, applied interests, orderliness, submissiveness, closeness, sensuousness, expressive-constraint and egoism diffidence. These factors were found to be intercorrelated circularly and defined by three second-order factors—intellectual orientation, dependency needs and emotional expression.

4. *The Protest Scales*

Peterson's Protest Scales (Peterson, 1966) attempt to measure various protest issues on the campus. The scales include 27 issues. In a study by Peterson (1966), the reported intensity of protest stemming from each of 27 issues was weighed from 1 through 4 ('no protest' through repeated and prolonged protest). Correlations between the 27 protests yielded 6 factors: quality of instruction, faculty affairs, administrative paternalism, political extremist visitors, civil rights and U.S. militarism.

5. *Medical College Environmental Scales*

Medical School Environment Inventory or MSEI by Hutchins, (1962) is an instrument to measure the environment of the medical colleges. This is a 69-item inventory consisting of the following scales: (i) General Esteem, (ii) Academic Enthusiasm, (iii) Extrinsic Motivation, (iv) Breadth of Interest, (v) Intrinsic Motivation, and (vi) Encapsulated Training. This inventory is an extension of the environmental scales developed by Pace and Stern, Astin, Thistlethwaite, and Halpin and Croft, to medicine and has internal consistency coefficients ranging from .88 to .99.

6. *The Environmental Assessment Technique*

EAT or the Environmental Assessment Technique is another technique developed by Astin and Holland (1961) and attempts to assess the college environment in terms of eight characteristics of the student body: its size, average intelligence, and six personal orientations—Realistic, Intellectual, Social, Conventional, Enterprising and Artistic. These variables were found to be moderately correlated with CCI and CUES, and predict the "effects" of the college as reported by the student (Astin, 1963).

7. *Factor Analysis of Characteristics*

Astin (1962, 1965 a,) and Richards *et al* (1966) have described the college environments in another way by factor-analysing the college characteristics. Astin (1965) has pointed out to another way of viewing the college environments as simply a set of potential stimuli, or "observable characteristics of the college that are capable of changing the sensory input to the student attending the college." Richards (1968) has factor-analysed 28 characteristics of 100 American and Canadian medical colleges. The four factors observed are:

1. *Factor A*, with high loadings of many out-of-state students, high tuition, more applications than admissions, privately or religiously controlled, and most of the students who have completed four years of college.

2. *Factor B*, with the most important characteristics of the high scoring college. As that it is located in Canada, it requires neither MCAT nor interview, but requires higher that average number of hours in physics, and has a high number of teaching-hospital beds relative to its enrolment.
3. *Factor C*, colleges having loading of this factor describe a college with large number of students, graduate degree candidates, and post-doctoral students, and is located in a large community having relatively large financial aid.
4. *Factor D*, with colleges having loading of this factor having a large number of interns, residents, and teaching-hospital beds relative to number of medical students, and requires large credits in biology and chemistry.

Factors A, B, C and D are named as Affluence, Canadian vs. U.S. Admission Practices, Size, and Emphasis on Hospital Training respectively.

8. *The Learning Environment Inventory*

The Learning Environment Inventory or LEI developed by Anderson (1970) describes the classroom climate along 14 dimensions or scales. Each scale contains seven items, selected by factor analysis, which are statements descriptive of typical high school classes. The respondents expresses agreement or disagreement with each item on a four-point scale. For each of the 14 dimensions, the mean response on the seven items is calculated and the mean of all the ratings in each class provides the estimate of the collective student perception of their classroom climate. The 14 scales of LEI are: 1. Intimacy, 2. Diversity, 3. Formality, 4. Speed, 5. Environment, 6. Friction, 7. Goal direction, 8. Favouritism, 9. Difficulty, 10. Apathy, 11. Democratic, 12. Cliqueness, 13. Satisfaction, and 14. Disorganization.

9. *The Pupil Activity Inventory*

The Pupil Activity Inventory or PAI is another inventory developed by Anderson (1970) which is a 16-itemed instrument to measure the frequency with which pupils engage in a number of science-related activities such as reading about science, visting museums and programme about science on television.

10. *Experience Questionnaire*

The Experience of College Questionnaire is another questionnaire which has been used to measure the student-faculty relations in colleges (Chickering, 1969).

11. *College Satisfaction Index*

Another instrument developed in these lines but named differently is the College Satisfaction Index or C.S.I. This was originally developed by Roy (1949) and modified and used by Gamelin (1953). It consists of nine sections with 27 items concerning the satisfaction with nine areas: curriculum, instructors, social life on the campus, professional counselling, faculty advising, opportunities for cultural development, health service, living quarters, and college in general. Three responses are elicited from the student on each section. First the student indicates how much he liked that aspect of the university; next he indicates how much of the time he felt satisfied with that aspect. Finally, he responds in terms of his attitude towards changing that aspect.

12. *School Survey*

The School Survey is an inventory covering significant elements of the teacher's work environment. It consists of 125 items arranged into 14 categories, after extensive reviews and analysis (Coughlan *et al*, 1964, 1970). The factors that were obtained through this survey include factors related to administrative operations (Board functioning, system administration, work load, materials and equipment, building and facilities); factors related to working relationships (principal relations, college relations, community relations); factors related to school effectiveness (instructional programme, student development); and factors related to career fulfilment (performance appraisal, financial incentives, professional autonomy).

13. *The Tape*

The Transactional Analysis of Personality and Environment or TAPE does not treat the environment and the self separately as do Stern's indices. This questionnaire makes use of the Semantic Differential Technique. Pervin (1967) used this instrument in studying the relationship between self-environment similarly and satisfaction with the environment. The concepts of self-college, and ideal-self were rated on 52 polar adjective scales, and satisfaction with the environment was indicated on five scales.

14. *The Organizational Climate Questionnaire*

The Organizational Climate Descriptive Questionnaire or OCDQ by Halpin and Croft (1963) attempts to measure the climate of institutions on eight scales. The first four of the scales pertain to the group characteristics while the rest measure the characteristics of the head of the institution. The dimensions measured by the sub-tests are: disengagement, hindrance, esprit, intimacy, aloofness, production emphasis, thrust and consideration. This test has been used in India by Sharma (1968, 1969) and Bayti (1970) in measuring the organizational climate of schools.

15. *Description Instruments*

The Teacher Description Instrument or TDI to measure the teacher behaviours can also be considered as an environmental scale as it aims at describing teacher behaviour. The instrument consists of 147 items+3 items to test criterion variables. A five-point scale to rate the frequency of occurrence of each behaviour is used in this instrument (Deshpande *et al*, 1970). This instrument has been used on 674 undergraduate students who rated 32 of their regular classroom teachers. When factor-analysed, 14 meaningful dimensions were obtained: motivation, rapport, structure, clarity, content mastery, overload, evaluation, use of teaching aids, instructional skill, teaching styles, encouragement, individual assistance, interaction and text adherence.

16. *Phenomenal-Self and Phenomenal Environment Scales*

A notable and recent deviation in the environmental assessment techniques is perhaps viewing the environment as a part of phenomenal-self. Such an environment, existing in the phenomenal-self of the individual has been named by Kubiniec (1970) as Phenomenal environment. The techniques described so far can be grouped into those which take into consideration the objective characteristics of the environment and those which measure the Subjective Perceptions of the Environment. Kubiniec, starting with the assumption that it is not the objective environment which matters, but it is how the individual sees and interprets the environment, has used the term "Phenomenal Environment." Kubiniec's Phenomenal Environment scales assesses 4 characteristics of the environment (Studying, Reading, Learning and College degree), each characteristics being rated by 15 semantic concepts (on a semantic differential) grouped under three dimensions:

1. *Evaluative* consisting of good-bad; useful-useless, important-unimportant; interesting-boring; and enjoyable;
2. *Potency* consisting of strong-weak, serious-humorous; masculine-feminine; severe-lenient, and rugged-delicate; and
3. *Activity* consisting of active-passive, excitable-calm, complex-simple; tense-relaxed and energetic-lethargic.

17. *Organizational Climate Questionnaire in Industries*

In 1968 an attempt has been made by the author of this article to measure the organizational climate of the small industries. A review of the studies in Industrial Psychology has revealed that these studies aimed at correlating one or other of the variables like Job-satisfaction, Job-security, wages, working conditions, communication patterns, etc., with productivity; but attempts have not been made to study all the organizational variables simultaneously. The organizational climate Questionnaire was developed with an intention to study whether organizational climate of industries can be treated as a multi-dimensional variable that could be measured. This Questionnaire consists of 23 likert type questions to measure the organizational climate on 19 dimensions (Rao, 1968, and 1969). A questionnaire to measure the Job-satisfaction in small industries (attempts to study the satisfaction of industrial workers with a few more variables) has also been developed (Harigopal, 1968); and perhaps can be taken as

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an indirect measure of industrial climate.

RESEARCH OF INSTITUTIONAL ENVIRONMENT

Research aimed at identifying the institutional environment dates back to the 1930's when the first studies by Prentice and Kunkel (1930, 1931) appeared. These studies aimed at identifying the college environments that are effective in stimulating achievement motivation in the students. After these studies, only a few researches were conducted on the institutional environments till the 1960's. Whatever studies have been conducted till the 1960's usually centred round measuring the influence of college or institutional environments on the productivity of the students or the institutional members. Since the 1960's, the interest in this topic has widened and researchers got interested in studying the influence of the institutional environments on various personality and other variables besides the productivity or the achievement variables. A few of the researches conducted in the past few years on various aspects relating to the institutional environments have been described below to give an idea of the trends.

1. *Influence of Institutional Environments on Student Achievement and Learning*

Studies relating to the influence of environment on the achievement of students are also known as "College Productivity Analysis Studies." They started with a design for identifying the characteristics of institutions which have produced students who obtained scholarly recognition later or showed some distinction or the other. Perhaps the best known study in this direction is that of Knapp and Goodrich (1952) in which colleges were compared with respect to the outputs of their alumni who later earned the Ph.D. degree. Other investigators who have reported studies conforming to this strategy include: Kunkel and Prentice (1939), Kunkel (1941), Visher (1947), Taxler (1957), Thistlethwaite (1959, 1959 a), Astin (1961, 1962, 1965), Nichols (1965), Astin and Panos (1966), and Skager, Holland and Braskamp (1966). One shortcoming that has been repeatedly pointed out in these studies is the lack of comparability of the entering abilities of the students. The observed differences among the productivity of students may not reflect the influence of the environment of the institution, but may only be reflecting the nature of students that join that particular college. Recently attempts have been made to control or match students on their entering abilities and see if different environments have changed their abilities to any significant level. Irrespective of some of the weaknesses involved in the recent studies the findings are often interesting. McDill *et al* (1967) have attempted to assess the influence of different pedagogical and social dimensions of school environment on achievement of the students while controlling the relevant personal variables. The analysis revealed that the effect of the socio-economic context of the school on individual achievement tends to disappear when personal variables are controlled. However, even when both the schools' socio-economic context and personal attributes were held constant, the various dimensions of school environment had significant effect on students' performance. These results indicated that when intellectualism, achievement, and competition are stressed by faculty and students it conduces to higher achievement. Gottheil *et al* (1968) in their study of 157 medical students on Stern's CCI and ratings by their teachers on their behaviour towards the patients found that 28 of the 30 CCI scales were significantly related to the ratings of their behaviour towards patients. Students who perceived the school as encouraging understanding, reflectiveness, ambition, socio-political participation, emotional expression, spontaneity, aesthetic appreciation, risk-taking, non-conformity, and reliance on others were rated as having a high regard for their patients and being sensitive to their needs. Hinton (1968) in a study of the effect of environmental frustration on creative problem-solving concluded that the environmental frustration significantly reduced creative problem solving.

Welberg and Anderson's (1968) study on classroom climate considered the relationships between the individual pupil perceptions of their class and their individual learning. A series of studies on high school physics classes throughout the nation had shown that measures of student perceptions of classroom climate, obtained at midyear, predicted gains in cognitive, affective, and behavioural learning criteria during the year.

Sharma (1969) administered Halpin and Croft's Organizational

Climate Descriptive Questionnaire to 626 teachers from 56 schools. Organizational climate was found to be related to the achievement of boys. The correlation coefficients of different factors of OCDQ with achievement are: Disengagement, —.67; Hindrance, —.33; Espirit, +.59; Intimacy, +.25; Aloofness, -.46; Production Emphasis, +.21; Thrust, +.58; and Consideration, +.44. Using the Learning Environment Inventory, Anderson (1970) has found that the factor Intimacy is positively related to scores on Test Understanding Science (TOUS) for girls of high ability and negatively for girls of low ability. Intimacy indicates anormative behaviour system developed in girls which affects their achievement. Due to the norms developed in low-ability girls, they collectively do poorly on the test. The Environment scale of the LEI showed a positive relationship with Physics Achievement Test (PAT) and TOUS for males. The Favouritism scale showed a negative relationship with learning as measured by the Science Process Inventory. No relationship was found between Satisfaction and learning, while scores on Disorganization were positively related to scores on PAT for males. Kubiniec (1970) in his study of 468 students, divided them into four groups on the basis of their achievement and assessed the phenomenal-self as well as phenomenal-environment perceptions of these students. From his research he concluded that academic success in college can be predicted by measures of global perceptions of one's self and one's environment. One novelty in Kubiniec's study is to treat the perception of environment as a part of self-perception. Perhaps this falls in line with the personality-environment or need-press interaction outlook started by Stern. Another suggestion worth noting made by Kubiniec is to differentiate between evaluating the environment and describing the environment. Other recent studies in this area include those by Alder (1969), Anderson (1969, 1970), Anderson and Welberg (1968), Anderson, Wilberg and Welch (1969), Andrews (1967), Astin (1963 c), Haefner (1968), Kallick (1967), Kramer *et al* (1968), Meyers (1967), Reiner (1970), Spuhler (1967), Voss (1967), and Welberg (1968, 1969, 1969 a, 1969 b, 1970)

The studies indicate mainly two noteworthy points in the environmental research:

1. That the institutional environment does play a significant

role in determining student achievement, either by direct influence as an independent variable or by indirect influence as an intervening variable.

2. That, as research is growing on this area, the researchers are becoming more and more aware of the need for using sophisticated designs with well-controlled groups in assessing the environmental influences.

2. *Personality and the Institutional Environments*

Research on institutional environments has gone beyond the attempts to find out the effect of institutional environment on the achievement or productivity of the students. Recent researches started testing whether different institutional climates have differential effects on student personalities, and whether the personalities of the students play any role in their perception and interpretation of the environment.

Peyre (1967), while discussing the etiology and development of student maladjustment to an academic environment, argued that adjustment problems of students are associated with those of the institution itself. He suggested a reorientation programme, with cooperation of teachers, psychologists and parents, to solve these problems. King *et al* (1968) in a carefully designed surgical clerkship programme delegating freedom and responsibility to students found that they differed with the control groups on MSEI on a few dimensions favourably. Many of them changed their career choices as a result of this programme and gave up the plan of a solopractice career. A significant increase in the incidence of expected commitment to surgical careers was observed.

Bar-Yam (1969) presented evidence that environmental scales moderate the relationship between personality and learning criteria.

Yonge (1968) has argued that CUES will give different personality correlates in different environments if the relationship betwen individual and the environment is a reciprocal one or two aspects of a whole or Gestalt. Wulberg and Ahlgren (1970) have shown that the classroom climate can be predicted from a number of antecedent and concurrent variables; student personality measures, student scores on cognitive and non-cognitive pre-tests, students' biographical characteristics, the course text, the teacher's experience with the course, and the class-size. Eight canonical variables from these several sets of predictors were significantly related to the environment scores; in addition, IQ, and the fraction of girls in the class were found to be significant predictors of environment.

Mitchell (1968) found that perceptions of the environment are related to personality characteristics, particularly the trait of conformity.

Duling (1969) administered CUES to 683 students of Colorado State College. Results showed that women perceived the college as more group-centred, conforming, and cooperative than did the men; married students rated the college higher than single students on awareness, propriety, and scholarship; sorority and fraternity members saw their environment as more practical and group-oriented than did non-members; and transfer-students considered the college to be higher scholastically than did the native students, which is expected because the transfer students usually get transferred to what they consider better colleges.

Other investigators who worked on this aspect of environmental studies include: Astin (1964, 1965), Brown (1967), Eberlein (1968), Eddy (1959), Feldman (1969), Gurin and Katz (1967), Haefner (1968), Hutchins (1962), Jambura (1967), Margulies (1969), McCormick (1967), Nichols (1965), Thistlethwaite (1965, 1966), and Yonge (1968). These investigators touched on the different aspects of the personality as well as the environment and it is too early to conclude anything on the influence of environment on personality or the role of personality in the perception of the environment. A reasonable hypothesis may be that some personality variable (specially the affective variables like the needs, values and emotions) make individuals perceive the environments differently, and such perceptions will in turn influence the same or the other personality variables.

3. *Correlates of Satisfaction with the Institutional Environment*

Apart from the job-satisfaction studies which measure the satisfaction of employees, attempts also have been made to measure the satisfaction of the students (who are products but not employees) with the environment. Two recent studies worth noting in this area are by Pervin (1967) and Berdie *et al* (1970).

Pervin investigated the relationship between perceived self-environment similarity and satisfaction with the environment. Three hundred and sixty-five subjects responded to one version of the Transactional Analysis of Personality and Environment (TAPE) Questionnaire based on semantic differential. The concepts of self, college, and ideal self were rated on 52 polar adjective scales, and satisfaction with the environment was indicated on five scales. Perceived self-college similarity was related to ratings of satisfaction with the college environment. The research also indicated the usefulness of Semantic Differential for environmental research. Berdie *et al* in their research on 300 students from six colleges found that graduating seniors on the average expressed mild satisfaction with the curriculum, instructors, social life, cultural development, health services, living quarters and the university in general. The variations in perceptions were low on satisfaction with curriculum, instructors, and college in general. The results suggested that an average student, when graduated from the university, is mildly satisfied with his experiences, neither wildly enthusiastic nor tremendously disappointed. A mild relationship was observed between the number of credits in the university and expressed satisfaction with the university. Expressed satisfaction with curriculum on the student's course of study was related to the number of quarters a student attended the university, the total number of credits completed, the Hy, Ma scores of MMPI, and the family relations, social relations, reality and leadership scales of MCI.

The fewer the semesters attended and the smaller the total number of credits completed, the greater the satisfaction.

The students who expressed the most satisfaction with his curriculum at the time he graduated tended to be the one who spent the least amount of time in college, was required to complete the fewest number of credits, was the most emotionally expressive, had the most satisfying relationship with other people, including family and friends, and was the most "emotionally mature". The more extroverted a student appeared from his personality scores, the more satisfied he was with his social life on the campus. The better his relationships with other people and his emotional stability, and the more realistic his approach to life, the greater his expressed satisfaction with the social life on the campus. The more defensive the person and the less trusting of others, the greater his satisfaction with counselling. Persons with the least satisfactory family and home adjustments are the ones who expressed greatest satisfaction with counselling.

In total, the results suggest that to a large extent satisfaction with the university is associated with certain characteristics of students at the time they enter. The multiple and canonical correlations suggest that of the variances in explaining expressed satisfaction with the university at the time of graduation, approximately one-third can be attributed to personality differences observable at the time of entrance. A student's progress in the university is related to his expression of satisfaction at the time of graduation. To a large extent, satisfaction is being formed or developed while the student progresses through college and frustrations resulting from delay, poor grades or failure or inability to register for or complete courses affect satisfaction. The results of this study suggest that the extent to which a student is satisfied with college depends in part on his own history and personality, and in part on the facility with which he obtains his academic objectives, and the services which the university makes available to him: "Perhaps the most significant determinant is the student; the next significant the university and the third most significant, the student's progress."

4. *Other Variables*

Apart from the achievement, personality and satisfaction variables, researches have also been attempted to classify institutions on the basis of the environmental scales or certain other characteristics, such as seeing the kind of students the institutions with different profiles attract, the attrition rates in these colleges, and so on.

Hutchins (1965) in his analysis of the attrition rates in medical schools found that attrition rates were high in tax-supported schools rather than in private institutions. Low attrition-rate schools had shown significantly greater total expenditure than high-attrition schools;

emphasize research; have a larger number of research dollars per faculty member; accept a higher proportion of students from outside their state; and possess environments for learning which intrinsically motivate the students with high scholastic aptitudes, high *n* achievement, low need for deferent behaviour and high aesthetic and religious values. High-attrition schools were producing a significantly larger proportion of students interested in general and straight speciality practice as opposed to careers having affiliation with academic medicine.

Nichols (1966) has presented convincing evidence that institutions with different CUES profiles attract applicants of different ability. For example, he found that relationships between student ability and the scholarship score of CUES were in the high .40s.

Peterson (1966) using protest scales found that the proportion of Ph.D.s on the faculty (considered as a crude measure of institutional quality) was significantly and positively related to protest over all-campus issues. Other investigators who did research in these lines include Altbach (1969), Astin (1963), Sharma (1968, 1969), Bayti (1970), Berreman (1967), Boroff (1962), Boyer (1965), Chickering (1969, 1969 a), Deshpande (1970), Duling (1969), Dunn (1968), Herr (1965), Harvey (1968), Hutchins and Wolins (1963), Hutchins (1965), Kasper (1965), Keniston (1967), Maclean (1967), Martin (1967), Minzey (1967), Mitchell (1968), Moog (1967), Newman (1963), Pace (1958, 1965), Richards (1966, 1968) and Webb (1967). Some of these studies demonstrate the existence of differences in environments of the institutions while others relate such differences to a few other variables, student stress and campus problems.

Another set of studies on environments merely aims at testing the validity of the instruments developed to measure the environments. For example, the College and University Environment Scales have been put to test by a number of investigators.

The adequacy, particularly as regards to the objectivity and representativeness, of the CUES to detect and describe the prevailing atmosphere on the campus was recently tested by Grande and Loveless (1969). The scales were administered to three groups of students. The first was a random, stratified sample of 152 undergraduates (freshmen excluded); the other samples were drawn from the general population of psychology students (two groups—one with 52 and the other with 58, freshmen excluded). Analysis of the data revealed significant differences in response among the groups, and especially between the two groups of psychology students. Further, it was found that the scales, 'scholarship' and 'community', more accurately reflected group opinion than did the scales, 'awareness' and 'propriety'. Grande and Loveless have questioned the advisability of generalizing the opinions of small groups of students to the institutional climate.

In another study by Sasajima *et al* (1968) CUES did not predict protest concerning campus problems, it was, however, a reasonably good predictor of student protest over off-campus issues.

Mayhew (1969) has presented a significant point of view, that also emerges from some of the environmental researches; that most colleges have little or no demonstrable influence on the students and that the most important force of change seems to be "other students'. Some other studies in this area include those by Pervin (1967 a), Sasajima (1968), Schwab (1969) and Taylor (1968).

Astin (1963) has attempted to validate the EAT. Hutchins (1965), Hutchins and Nonneman (1966), Kubiniec (1969, 1970) and Mitchell (1969) also have attempted to assess the validity and efficiency of some of the environmental assessment methods. In general, there do not seem to be a sufficient number of studies conducted to validate any particular instrument. One answer to this tendency may be that the validity of the environmental assessment methods is not a serious question, as most of these use either direct questions to the students or measure the characteristics of the institutions from the available records which are trustworthy, unlike in the industries. While the latter way of measuring the environments by taking characteristics such as the total number of students enrolled, total number of Ph.D.s
culty, funds available, number of research programmes under-
c., does not need any validational studies, the first way of mea-
e environments through the perceptions of the students always
ict validation, especially in view of the fact that the direct
sked in these questionnaires suffer from the factor of "So-
ility" by virtue of which there is a tendency on the part of
dents to give only desirable responses. Such socially desirable
ses are perhaps more common in a set-up like India's where
e of religious-mindedness, respect for the teacher and sometimes

even the fear of the authorities prevail in the students to a great extent.

5. *Environmental Research in Industries*

While this is the trend of research in educational institutions, there is altogether a different type of interest shown by the researchers working in the industrial set-up. "Organizational Climate" is the term used in the environmental research of the industries. This is rather a new area of research for them. Gilmer (1966) described several studies on organizational climate, each of which concentrated measuring one or a few variables of the organization rather than taking into account all the variables. Nelson (1960) has classified the organizational climate into four types: the bureaucratic, the autocratic, the idiocratic and the democratic. A few investigators like Gilmer (1961) and Dill *et al* (1962) have noted the differences in organizational climates or what they call "Organizational personalities" among the industries. Litterer (1963) has used the term "Ogranizational style" in a manner equivalent to organizational climate, but he did not explore the area fully. Forehand and Gilmer (1964) have pointed out that only recently psychologists have become aware of the importance of studying environmental variation in organizations. They have used the term "Organizational climate" to refer to the set of characteristics that describe the organization, and that (a) distinguish the organization from others, (b) are relatively enduring over time, and (c) influence the behaviour of people in the organization. Forehand and Gilmer say that these characteristics (defining properties) were chosen to focus attention upon features of organizational variations that are amenable to specification, measurement, and incorporation into empirical research. Perhaps this was the first attempt to operationalize this concept, and it assumes that organizations differ in their climates basically. Kahn *et al* (1964) have remarked that "the concept of organizational climate, as its analogical name implies, sums up many of the determining conditions for what things shall grow in organizations and what things be flighted. The vocabulary of organizational variables require this term or its equivalent". (p. 150.) This implies that one must take into consideration all the organizational variables in any study of the organizational climate. A multidimensional approach in studying the organizational climate has been stressed by Rao (1968) and by Rao *et al* (1969) in studying the organizational climate of small industries. Rao *et al* (1969) have shown that the organizational climate can be treated as a multidimensional variable which follows the normal curve. In their study of the relationship between perception of organizational climate and productivity, no significant relationship was found between the two variables. However, the limitation of the study as regards any valid conclusion is that they took into consideration only a sample of 19 variables to measure the organizational climate, though they stressed that all the variables showed be taken into account. Research in this area is recently gaining momentum in the industrial set-up, but on different lines. Perhaps if productivity studies can establish a definite relationship between the perception of organizational climate and productivity, they can give a number of leads to the educationists. These studies are much easier and do not require very sophisticated designs as in the educational set-up, as industrial organizations and their products are more amenable for measurement and evaluation, unlike the students and their teachers which are complex systems for study.

Implications for Educational Research in India

The entire gamut of socio-psychological researches carried out in the field of environmental effects seem to agree on one aspect: that the nature of institutional environment has significant influence on the gestalt the student carries with him, and how he interprets the situations he comes across. Besides, the role played by the environment seem to be crucial in determining quite a few things like institutional productivity. In spite of the positive demonstrations by the researchers in this area, such research has not found its way to the Indian educational scene so far.

There have been a few training programmes conducted for teachers as well as students to boost up their achievement motivation with the object of achieving higher academic standards. Often, in such training programmes and in the in-service training of the teachers, it is not unusual to hear complaints about resistant heads of the institutions, the bureaucratic atmosphere, the poor working conditions in which they have to work, and so on. The same tendency of complaining is also common in youth-training programmes in which the target is again the administration as well as the teachers. Mainly, the environmental studies should take into consideration the faculty's perception of the administration, students, academic atmosphere, work conditions, equipment, and other facilities such as health and play, etc., the students' perception of the above and in addition the faculty. A multidimensional approach to the environment viewing it as a conglomeration of variables rather than a few variables is needed. Environmental research may help the Indian educationists in understanding, predicting and controlling some critical incidents in education. Differences in perception of the environment by teachers and students may reveal that student-teacher conflicts exist on certain issues; or may hint at the likelihood of student unrest in the campus. Measurement of the perceptions of the environment by the students from time to time and keeping a proper record of the scores may reveal some of the spurts in the student perceptions and may caution the authorities whenever there is a trend pointing to some undesirable changes. For example, if the scores on intellectualism in the climate are going down from time to time, this is something for the educational administrator to take note of and make the needed changes to boost it up. Similarly, by keeping the satisfaction records of students as well as teachers of an institution one may see whenever there is a decline and take precautions lest unrest may set in. Modification or control of the environment is not altogether impossible. In fact, it is perhaps easier to bring about changes in the environment than to modify behaviour. Some of the causes of student stress and unrest seem to follow directly from the incongruency between student desires and expectations which do not tally with institutional realities. By understanding the expectations and by measuring the percieved realities through environmental studies as Brown (1967) has argued, perhaps it is possible to devise a variety of environments that will help rather than hinder the emotional and intellectual development of the students. While motivation training programmes go a long way in provoking the individual to do active work, environmental studies are needed to measure and change the environment to suit the needs of a motivated individual. Otherwise the training programmes meant for motivating will only help to frustrate the motivated individual.

REFERENCES AND BIBLIOGRAPHY

Abrahamson, Royce L. The identification and ranking of significant factors in the internal organizational environment by managers at various levels. *Dissertation Abstracts*, 1968, 28 (10-A), 3819-3820.

Alder, B. Lararoll. Eleoprestation och social Klimat (Teacher role pupil achievement and social climate). Larartidningen/Svcn SK Skoltidning, 1969, 40, 22.

Altbach, Philip G. Diversity within student populations. *Journal of the National Association of Women Deans and Counsellors*, 1969, 32 (Spring), 126-129.

Anderson, G.E. Effects of classroom social climate on individual learning. Unpublished doctoral dissertation, Harvard University, 1968.

Anderson, G.J. and Walberg, H.J. Classroom climate and group learning. *International Journal of Educational Sciences*, 1968, 2, 175-180.

Anderson, G.J., Walberg, H.J. and Weleb, W. Curriculum effects on the social climate of learning. *American Educational Research Journal*, 1969, 6, 315-329.

Anderson, Gary J. Effects of classroom social climate on individual learning. *American Educational Research Journal*, 1970, 7 (2), 135-152.

Anderson, R.C. Learning in discussions, a resume of the authoritarian democratic studies. *Harvard Educational Review*, 1959, 29, 201-215.

Andrews, Frank M. Creative ability, the laboratory environment, and scientific performance. *IEEE Transactions on Engineering Management*, 1967, 14 (2), 76-83.

Argyris, C. Some problems in conceptualizing organizational climate: a case study of a bank. *Admin. Science Quarterly*, 1958, 2, 501-520.

Astin, A.W. A reexamination of college productivity. *Journal of Educational Psychology*, 1961, 52, 173-178.

Astin, A.W. and Holland, J.L. The environmental assessment technique: a way to measure college environments. *Journal of Educational Psychology*, December 1961, 52, 308-316.

Astin, A.W. "Productivity" of undergraduate institutions. *Science*, 1962, 136, 129-135.

Astin, A.W. Influences on the student's motivation to seek advanced training: Another look. *Journal of Educational Psychology*, 1962a, 53, 303-309.

Astin, Alexander W. An empirical characterization of higher educational institutions. *Journal of Educational Psychology,* August 1963, 54, 217-226.

Astin, Alexander W. Differential college effects on the motivation of talented students to obtain the Ph.D. *Journal of Educational Psychology,* 1963 (a), February, 54, 63-71.

Astin, Alexander W. Further validation of the environmental assessment technique. *Journal of Educational Psychology,* 1963 (b), August, 54, 217-226.

Astin, A.W. Undergraduate institutions and the production of scientists. *Science,* 1963c, 141, 334-338.

Astin, A.W. Personal and environmental factors associated with college dropouts among high aptitude students. *Journal of Educational Psychology,* 1964, 55, 219-227.

Astin, A.W. Effects of different college environments on the vocational choices of high aptitude students. *Journal of Counselling Psychology,* 1965, 12, 28-34.

Astin, A.W. Recent studies of college environments. Paper read at American Personnel and Guidance Association, Minneapolis, 1965 (a).

Astin, A.W. *Who Goes Where to College,* Chicago: Science Research Associates, 1965 (b), 125 pp.

Astin, A.W. and Panos, R.J. A national research data bank for higher education. *Educational Record,* 1966, 47, 5-17.

Astin, A.W. The inventory of college activities: assessing the college environment through observable events. Paper presented at the 1965 Annual Meeting of the American Psychological Association, Washington D.C., 1966a. (mimeo.)

Astin, A.W., Panos, R.J., and Creager, J.A. A program of logitudinal research on the higher educational system. *ACE Research Reports,* 1 (1), American Council of Education, 1966b.

Astin, A.W. *The College Environment.* American Council of Education, 1967.

Axelord, Joseph, Freedman, Mervin, B., Hatch, Winslow R., Katz, Joseph and Sanford, Nevitt. *Search for Relevance.* San Francisco: Jossey-Bass, Inc., 1969, 244+1pp., $7.75.

Barelay, James R. Approach to the measurement of teacher "press" in the secondary curriculum. *Journal of Counselling Psychology,* 1967, 14 (6), 552-567.

Barton, A.H. *Organizational Measurement and Its Bearing on the Study of College Environments.* New York: College Entrance Examination Board, 1961.

Bar-Yam, Miriam. The interaction of student characteristics with instructional strategies: A study of students' performance and attitude in a high school innovative course. Unpublished Ph.D. Thesis, Harvard University, 1969.

Barzuns, Jacques. *The American University: How It Runs, Where It Is Going.* New York: Harper and Row, 1968.

Bayti, Jamnalal. A compartive study of the organizational climate in Rajasthan schools. *Indian Educational Review,* 1970, 5 (2), 107-118.

Becker, H.S., Geer, B., Hughes, E.C. and Strauss, A. *Boys in White: Student Culture in Medical School.* Chicago: University of Chicago Press, 1961.

Bendig, A.W. A factor analysis of student ratings of psychology instructors on the Purdue Scale. *Journal of Educational Psychology,* 1954, 385-393.

Bendig, A.W. Ability and personality characteristics of introductory psychology instructors rated competent and empathetic by their students. *Journal of Educational Research,* 1955, 48, 705-709.

Berdie, Ralph F., Pilapil, Bonifacio and Im, In Jae. Entrance correlates of university satisfaction. *American Educational Research Journal,* 1970, 7 (2), 251-266.

Bereiter, C. and Freedman, M.B. Fields of study and the people in them. In N. Sanford (Ed.), *The American College.* New York: Wiley, 1962.

Bereiter, C. Some persisting dilemmas in the measurement of change. In C W. Harris (Ed.), *Problems in Measuring Change.* Madison, Wis.: University of Wisconsin Press, 1963.

Berreman, Norman P. An investigation of certain elementary school environments having different mental health services. *Dissertation Abstracts,* 1967, 28 (4-A), 1289-1290.

Boroff, David. *Campus U.S.A.* New York: Harper and Brothers, 1961.

Boroff, D. *Campus U.S.A.* New York: Harper, 1962.

Boyer, E.L. and Michael, W.B. Outcomes of college. *Review of Educational Research,* 1965, 35, 277-291.

Brown, Donald R. Student stress and institutional environment. *Journal of Social Issues,* 1967, 23 (3), 92-107.

Campbell, D.T. and Clayton, K.N. Avoiding regression effects in panel studies of communication impact. *Studies in Public Communication.* University of Chicago Press, 1961, No. 3, 99-118, reprinted in Bobbs-Merrill, Reprint series in Social Sciences, S-353.

Campbell, D.T. and Stanley, J.C. Experimental and quasi-experimental designs for research on teaching. In N.L. Gage (Ed.), *Handbook for Research on Teaching.* Chicago: Rand McNally, 1963.

Campbell, D.T. From description to experimentation: Interpreting trends as quasi-experiments. In C.W. Harris (Ed.). *Problems in Measur-*

ing Change. Madison, Wis.: University of Wisconsin Press, 1963.

Chickering, Arthur W. Student-faculty relationship: bedrock for college governance. Revised version of paper read at Fifteenth Annual Institute on College and University Administration, University of Michigan, June 1969.

Chickering, Arthur W. *Education and Identity.* San Francisco: Jossey-Bass, Ins., 1969a.

Cochran, W.G. and Cox, G.M. *Experimental Designs.* New York: Wiley, 1950.

Cochran, W.G. Analysis of covariance: its nature and uses. *Bio-metrics,* 1957, 13 (3), 261-281.

Coffman, W.E. Determining students' concepts of effective teaching from their rating of instructors. *American Psychologists,* 1952, 7, 369.

Coleman, J.S.' *The Adolescent Sub-Culture.* Glencoe, Illinois: Free Press, 1961.

Cosgrove, D.J. Diagnostic rating of teacher performance. *Journal of Educational Psychology,* 1959, 50, 200-204.

Cotsonas, N.J. Jr. and Kaiser, H.F. A factor analysis of students' and administrators' ratings of clinical teachers in a medical school. *Journal of Educational Psychology,* 1962, 53, 219-223.

Coughlan, Robert J., Baehr, M.E., Pranis, R.W. and Renck, R. *School Survey.* Chicago: Industrial Relations Centre. The University of Chicago, 1964.

Coughlan, R.J. Dimensions of teacher morale. *American Educational Research Journal,* 1970, 7 (2), 221-234.

Creager, J.A. A multiple factor analysis of the Purdue Rating Scale for instructors. *Studies in Higher Education,* 1950, 70, 75-96.

David, J.A. *Great Aspirations.* Chicago: Aldine Publishing Co., 1964.

Deshpande, Anant S., Webb, Sam C. and Marks, Edmond. Student perceptions of engineering instructor behaviours and their relationships to the evaluation of instructors and courses. *American Educational Research Journal,* 1970, 7 (3), 289-306.

Dill, W., Hilton, T.L., and Reitman, W.R. *The New Managers.* Prentice-Hall, 1962.

Du Bois, P.H. *Multivariate Correlational Analysis.* New York: Harper, 1957.

Du Bois, P.H. and Manning, W.H. Methods of research in technical training. St. Louis: Washington University Tech. Rep. No. 3, ONR No. Nonr 816 (02), 1961.

Duling, John A. Differences in perceptions of environmental press by selected student subgroups. *Journal of the National Association of Women Deans and Counsellors,* 1969, 32 (Spring), 130-132.

Dunn, James A. The theoretical rationale underlying the development of the School Anxiety Questionnaire. *Psychology in the Schools,* 1968, 5 (3), 204-210.

Eberlein, E. Larry. The relationship between the communication behaviour of elementary school principals and the organizational climates of their schools. *Dissertation Abstracts,* 1968, 28 (10-A), 3919-3920.

Eddy, Edward D. *The College Influence on Student Character.* American Council on Education, 1959.

Feldman, Kenneth A. and Newcomb, Theodore M. *The Impact of College on Students.* Vols. I & II. San Francisco: Jossey-Bass, Inc., 1969.

Flanders, N.A. Teacher influence, pupil attitudes and achievement. Cooperative Research monograph No. 12, 1965, U.S. Department for Health, Education and Welfare. OD-25040.

Forehand, G.A., and Gilmer, B.V. Environmental variation in, studies of organizational behaviour. *Phychological Bulletin,* 1964, 62 (6).

Gibb, J A. Classroom behaviour of the college teacher. *Educational and Psychological Measurement,* 1955, 15, 154-263.

Gilmer, B.V.H. *Industrial Psychology.* New York: McGraw-Hill, 1966.

Goldsen, Rose K., Rosenberg, M., Williams, R.M. Jr., and Suchman, E.A. *What College Students Think.* New York: Van Nostrand, 1960.

Gottheil, Edward., Hassenfeld, I. and Gronkiewicz, E. Perceived medical school milieu and student-patient relationships. *Journal of Medical Education,* 1968, 43 (10), 1094.

Grande, P.P., and Loveless, E.J. Variability in the meaurement of campus climate. *College and University,* 1969, 44 (Spring), 224-248.

Green, Edith J. The relationship of self-actualization to achievement in nursing. *Dissertation Abstracts,* 1967, 28 (6-A), 2092

Gurin, Patricia and Katz, D. Motivation and aspiration in the Negro college. Office of Education, U.S. Welfare Project No. S-0787. Ann Arbor, Mich.: Survey Research Center, Institute for Social Research, University of Michigan, 1966.

Haefer, Donald A. Levels of academic achievement as related to environmental press and psychological needs of high ability liberal arts students. *Dissertation Abstracts,* 1968, 28 (10-A), 3998.

Halpin, Andrew W. The organizational climate of schools. Paper read at the meeting of CPNA held at Ohio State University, 1954.

Halpin, A.W. and Croft, D.B. The Organizational Climate of Schools. *Administration Notebook,* 1963, 11 (7).

Harigopal, K., Reddy, N.Y. and Chattopadhyay, S.N. Job-satisfaction and productivity in small industries. *Research Bulletin,* 1969, 5, 15-23.

Hendrickson, A.E. and White, P.O. Promax: A quick method for rotation to oblique simple structure. *British Journal of Statistical Psychology,* 1964, 17, 65-70.

Heir, Edwin L. Differential perceptions of environmental press by high school students. *Personnel Guidance Journal,* March 1965, 43, 678-686.

Harvey, O.J., Prather, Misha. White, B.J. and Hoffmeister, J.K. Teachers' beliefs, classroom atmosphere and student behaviour. *American Educational Research Journal,* 1968, 5 (2), 151-166.

Hinton, Bernard L. Environmental frustration and creative problem solving. *Journal of Applied Psychology,* 1968, 52 (3), 211-217.

Hutchins, E.B. The 1960 medical school graduate: his perception of his faculty, peers and environment. *Journal of Medical Education,* 1961, 36, 322-329.

Hutchins, Edwin B. The student and his environment. *Journal of Medical Education,* 1962, Part 2 (a), 37, 67-82.

Hutchins, E.B. The Evaluation of Environmental Determinants. Paper read at American Psychological Association, St. Louis, 1962 (b).

Hutchins, E.B. *The Measurement of Student Environment and Its Relationship to Career Choice in Medicine.* Association of American Medical Colleges, 1962. (mimeographed.)

Hutchins, E.B. and Wolins, L. Factor Analysis of Statements Describing Student Environments in American Medical Colleges. Paper read at Midwestern Psychological Association,, Chicago, 1963.

Hutchins, E.B. The AAMC longitudinal study: implications for medical education. *Journal of Medical Education,* 1964, 39, 265-277.

Hutchins, E.B. The AAMC study of medical student attrition: school characteristics and dropout rate. *Journal of Medical Education,* 1965, 40 (10), 921-927.

Hutchins, Edwin, B. and Nonneman, A.J. Critical Review of the Medical School Environment Inventory. *Journal of Medical Education,* September 1965, 40, 9, 912.

Hutchins, E.B. and Nonneman, A.J. Construct Validity of an Environmental Assessment Technique for Medical Schools. Paper read at American Educational Research Association, Chicago, 1966.

Inkeles, A. and Levinson, D.J. The personal system and the socio-cultural system in large-scale organizations. *Sociometry,* June 1963, 26, 217-228.

Irwin, Mary. *American Universities and Colleges.* (8th edn.) Washington, D.C.: American Council of Education, 1960.

Isaacson, R.L., McKeachie,, W.J., and Milholland, J.E. Correlation of teacher personality variables and student ratings. *Journal of Educational Psychology,* 1963, 54, 110-117.

Isaacson, R.L., McKeachie, W.J., Milholland, J.E., Lin, Y.G., Hofellar, M., Baerwaldt, J.W., and Zinn, K.L. Dimensions of student evaluations of teaching. *Journal of Educational Psychology,* 1964, 55, 344-355.

Jambura, John W. An analysis of certain relationships of student needs, college environment, and college choice. *Dissertation Abstracts,* 1967, 28 (2-A), 498.

Kahn, R.P., Diedrick, S.J., and Roesenthal, R.A. *Organizational Stress: Studies in Role Conflict and Ambiguity.* New York: John Wiley & Sons, 1964.

Kallick, Maureen. Organizational determinants of productivity. *Dissertation Abstracts,* 1967, 28 (6-B), 2607.

Kaspher, Eugene C., Munger, P.F., and Myers, R.A. Student perceptions of the environment in guidance and non-guidance schools. *Personnel and Guidance Journal,* March 1965, 43, 674-677.

Keniston, Kenneth. The sources of student dissent. *Journal of Social Issues,* 23, 108-137, July 1967.

King, T.C., Maxwell, J.G., Richards, R.G., Stevens, L.E., and Reemtsma, K. Research in undergraduate surgical education, innovation and evaluation. *Journal of Medical Education,* 1968, 43 (3), 373-382.

Knapp, R.H. and Goodrich, H.B. *Origins of American Scientists.* Chicago: University of Chicago Press, 1952.

Knapp, R.H. and Greenbaum, J.J. *The Younger American Scholar: His Collegiate Origins.* Chicago: University of Chicago Press, 1953.

Kramer, Marlene *et al.* Effect of teacher and situational variables on student achievement. *Nursing Research,* 1968, 17 (1), 10-18.

Kubiniec, C.M. The construct validity of phenomenal self and phenomenal environment variables: dimensionality of self concepts and relative efficacy of dimensions in predicting relative academic success. Unpublished doctoral dissertation, State University of New York, Buffalo, 1969.

Kubiniec, Cathleen M. The relative efficacy of various dimensions of the self-concept in predicting academic achievement. *American Educational Research Journal,* 1970, 7 (3), 321-336.

Kunkel, B.W. The representation of colleges in graduate and professional schools in the United States. *Association of American College Bulletin,* 1941, 27, 449-474.

Kunkel, B.W. and Prentice, D.B. The college's contributions to intellectual-leadership. *School and Society,* 1939, 50, 600-608.

Litterer, J.A. *Organizations: Structure and Behaviour.* New York: John Wiley and Sons, 1963.

Lord, F.M. Further problems in the measurement of growth. *Educational and Psychological Measurement,* 1958, 18, 437-451.

Lord, F.M. Large scale covariance analysis when the control variable is fallible. *Journal of the American Statistical Association,* 1960, 55, 307-321.

Lord, F.M. Elementary models for measuring change. In C.W. Harris (Ed.). *Problems in Measuring Change.* Madison, Wis.: University of Wisconsin Press, 1963.

Lord, F.M. A paradox in the interpretation of group comparisons. *Psychological Bulletin,* 1967, 68, 304-308.

MacLean, Lowe S. Variant perceptions of the environmental press. *Dissertation Abstracts,* 1967, 28 (6-A), 1991-1992.

Margulies, Newton. Organizational culture and psychological growth. *Journal of Applied Behavioural Science,* 1969, 5 (4), 491-508.

Martin, Georgia M. Differences in evaluation of college climate between freshman and senior women at the University of Georgia. *Dissertation Abstracts,* 1967, 27 (12-A), 4135.

Mayhew, Lewis B. *Colleges Today and Tomorrow.* San Francisco: Jossey-Bass Inc., 1969.

McCormick, Fred C. Relation of individual and institutional characteristics to students' personality needs at Saint Louis University. *Dissertation Abstracts,* 1967, 28 (1-A), 56-57.

McDill, Edward L., Meyers, Edmund D. Jr., and Rigsby, Leo C. Institutional effects on the academic behaviour of high school students. *Sociology of Education,* 1967, 40 (3), 181-199.

McKeachie, W.J. Student ratings of faculty: a research review. *Improving College and University Teaching,* 1957, 5, 4-8.

Meyers, Edmund D. Jr. Effects of social and educational climate of high schools upon the academic performance of Negro and white adolescents. *Dissertation Abstracts,* 1967, 28 (5-A), 1917.

Michael, W.B. and Perry, N.C. The comparability of the simple discriminant function and multiple regression techniques. *Journal of Experimental Education,* 1956, 24, 297-301.

Minzey, Jack D. A study of the relationship between teacher morale and student attitudes toward their school environment. *Dissertation Abstracts,* 1967, 28 (4-A), 1305-1306.

Mitchell, James V. Jr. Dimensionality and differences in the environmental press of high schools. *American Educational Research Journal,* 1968, 5 (4), 513-530.

Mitchell, James. V. Education's challenge to psychology: the prediction of behaviour from person-environment interactions. *Review of Educational Research,* 1969, 39 (5), 695-721.

Moos, Rudolf H. New developments in the conceptualization and the measurement of social environments. *Psychotherapy and Psychosoma-*

tics, 1967, 15 (1), 47.

Nasatir, D. A contextual analysis of academic failure. *School Review*, 1963, 71, 290-298.

Nelson, C.W. *A New Approach to Leadership.* Industrial relations centre, Univ. of Chicago, 1950.

Newcomb, T.M. and Feldman, K.A. The impacts of colleges upon their students. A report to the Canegie Foundation for the Advancement of Teaching. Ann Arbor, Michigan: University of Michigan, 1968.

Newman, M. *The Student and the College Community: A Study of Attrition and Persistence in a Highly Selective Liberal Arts College.* University of Chicago: Co-operative Research Project No. S-130, 1963.

Newsman, M. *The Student and the College Community: A study of Attrition and Persistence in a Highly Selective Liberal Arts College.* University of Chicago: Cooperative Research Project No. S-130, 1965.

Nichols, R.C. Personality change and the college. *NMSC Research Reports*, 1 (2), Evanston, Illinois: National Merit Scholarship Corporaration, 1965.

Nichols, R.C. College preferences of eleventh grade students. *NMSC Research Reports.* Vol. 2., No. 9. Evanston, Illinois: National Merit Scholarship Corporation, 1966.

O'connor, J.P. and Kinnane, J.F. A factor analysis of work values. *Journal of Counselling*, 1961, 8, 263.

Pace, C. Robert, and Stern, G.G. An approach to the measurement of psychological characteristics of college environments. *Journal of Educational Psychology*, October 1958, 49, 269-277.

Pace, C.R. and McFee, A. The college environment. *Review of Educational Research*, 30, 311-320, 1960.

Pace, C. Robert. Five college environments. *College Board Review*, Spring 1960a, 41, 24-28.

Pace, C. Robert. *CUES: College and University Environment Scales.* Technical manual. Princeton, New Jersey: Educational Testing Service, 1963.

Pace, C.R. *Preliminary Technical Manual,, College and University Environment Scales.* Princeton, New Jersey: Educational Testing Service, 1963.

Pace, C. Robert. The measurement of college environment. In Tagiuri, R., and Litwin, G.H. (Eds.). *Organizational Climate: Explorations of a Concept.* Boston: Graduate School of Business Administration, Harvard University, 1968.

Panos, Robert J. They went to college. A Descriptive Summary of the Class of 1966. Paper presented at the 1967 Annual Meeting of the Association for Industrial Research, Athens, Georgia, 1967, 39pp. (mimco.)

Panos, R.J. and Astin, A.W. Attrition among college students. *American Educational Research Journal,* 1968, 5 (1), 57-72.

Pervin, L. Satisfaction and perceived self-environment similarity: A semantic differential study of student college interaction. *Journal of Personality,* 1967, 35 (4), 623-634.

Pervin, L.A. A twenty-college study of student and college interaction using TAPE: rationale, reliability, and validity. *Journal of Educational Psychology,* October, 1967a, 58, 290-302.

Peterson, R.E. *The Scope of Organized Student Protest in* 1964-65. Princeton, New Jersey: Educational Testing Service, 1966.

Peyre, Vincent. Presentation d'une recherche sur I'nadaptation scolaire et sociale d'eleves des classe du premier cycle du second degree. (Research on the academic and social maladjustment of students in the first educational cycle at the secondary level). *Bulletin de Psychologie,* 1967, 20 (10-15), 892-896.

Porter, A.C. The effects of using fallible variables in the analysis of covariance. Doctoral dissertation, University of Wisconsin, Ann Arbor, Mich.: University Microfilms, 1967, No. 67-12, 147.

Prentice, D.B. and Kunkel, B.W. The colleges' contribution to intellectual leadership. *School and Society,* 1930, 32, 594-600.

Prentice, D.R. and Kunkel, B.W. The colleges' contribution to intellectual leadership-II. *School and Society,* 1931, 33, 280-282.

Rangnekar, S.S. The last alphabet on management theory Z. *Indian Management,* 1969, 8 (5), 15-19 and 34.

Rao, T.V. Perception of organizational climate, level of aspiration and productivity in small industries. SIET Research Monographs, 1968.

Rao, T.V., Reddy, N.Y., and Chattopadhyay, S.N. Conceptualizing and measuring organizational climate of a small industry—a psychological probe. *Research Bulletin,* 1969, 5, 29-34.

Reiner, John R. Students' academic ability and perceptions of college environment. *Journal of Experimental Education,* 1970, 38 (3), 69-71.

Remmers, J.J. *Manual of Instructions for the Purdue Rating Scale for Instruction* (Revised ed.).

Richards, J.M. Jr. A simple analytic model for college effects. *School Review,* 1966, 74, 380-392.

Richards, James M. Jr. Rand, L.M. and Rand, L.P. Description of Junior Colleges. *Journal of Educational Psychology.* August 1966, 57, 207-214

Richards, James M. Jr., Rand, L.M. and Rand, L.P. A description of medical college environments. *American Educational Research Journal,* November 1968, 5 (4), 647-658.

Rohles, Frederick, H. Jr. Environmental psychology: A bucket of worms.

Psychology Today, 1967, 1 (2), 54-63.

Ryans, D.G. A study of criterion data (a factor analysis of teacher behaviors in the elementary school). *Educational and Psychological Measurement,* 1952, 12, 333-334.

Ryans, D.G. *Characteristics of Teachers: A Research Study.* Washington, D.C., American Council of Education, 1960.

Ryans, D.G. Assessment of teacher behavior and instruction. *Review of Educational Research,* 1963, 33, 415-441.

Sanford, R.N. (Ed.). *The American College: A Psychological and Social Interpretation of the Higher Learning.* New York: Wiley, 1962.

Sasajima, M., Davis, J.A., and Peterson, R.E. Organized student protest and institutional climate. *American Educational Research Journal,* 1968, 5 (3), 291-304.

Schwab, Joseph, J. *College Curriculum and Student Protest.* Chicago: University of Chicago Press. 1969,

Sells, S.B. *Stimulus Determinants of Behaviour.* New York, Ronal Press, 1963.

Sequeira, C.E. Organizational climate in industry. *Indian Management,* 1964, 3 (1), 38-44.

Sharma, M.L. A comparative study of the organizational climate of government and private secondary schools of Churu district (Rajasthan). Unpublished NIE Associateship dissertation, National Institute of Education, NCERT, New Delhi, 1968.

Sharma, M. A comparative study of organizational climates of government secondary schools and private secondary schools of Churu district, Rajasthan. *Journal of Educational Research and Extension,* 1969, 5 (3), 120-126.

Shostrom, Everett L. *Personal Orientation Inventory (POI)*, Educational and Industrial Testing Service, San Diego, California.

Skager, R., Holland, J.L., and Barshamp, L.A. Changes in self-ratings and life goals among students at colleges with different characteristics. *ACT Research Reports,* No. 14, Iowa city, Iowa: American College Testing Program, 1966.

Smalzred, N.T., and Remmers, J.H. A factor analysis of Purdue Rating Scale for Instructors. *Journal of Educational Psychology,* 1943, 34, 363-367.

Smith, H.L. Interpretation of adjusted treatment means and regression in analysis of covariance. *Biometries,* 1957, 13, No. 3, 282-308.

Snedeker, J.H. and Remmers, H.H. Manual for the Purdue Instructor Performance Indicator. West Lafayette: University Book Store, Purdue University, Lafayett, Indiana, 1960.

Snow, C.P. *The Two Cultures: And a Second Look.* (Rev. edn.)

Cambridge: Cambridge University Press, 1964.

Solomon, D., Bezdeck, W.E. and Rosenberg, L. *Teaching Styles and Learning.* Chicago: Center for the Study of Liberal Education for Adults, 1963.

Spuhler, Lee. A study of the characteristics of the academic learning climate of Montana State University. *Dissertation Abstracts,* 1967, 27 (12-A), 4140-4141.

Stanley, J.C. A common class of pseudo-experiments. *American Educational Research Journal,* 1966, 3, 79-87.

Stern, G.G. *High School Characteristics Index, Form 960.* Syracuse: Syracuse University Psychological Research Centre, 1960.

Stern, G.G. Congruence and dissonance in the ecology of college students. *Students Medicine,* April 1960a, 8, 304-339.

Stern, G.G. Student values and their relationship to the college environment. *Research on College Students* (Ed. H.T. Sprague). Boulder, Colorado: Western Interstate Commission for Higher Education, 1960a.

Stern, G.G. Continuity and contrast in the transition from high school to college. In N.C. Brown (Ed.). *Orientation to College Learning: A Re-appraisal.* Washington, D.C.: American Council of Education, 1961.

Stern, G.G., Winters, C.L., Archer, N.S., and Mayer, D.L. *Evening College Characteristics Index, Form 161.* Syracuse: Syracuse University, University College, 1961.

Stern, G.G. The measurement of psychological characteristics of students and learning environments. In Messick, S.J. and Ross, J. (Eds.). *Measurement in Personality and Cognition.* New York: Wiley, 1962.

Stern, G.G. Environments for learning. In R.N. Sanford (Ed.), *The American College,* New York: Wiley, 1962a.

Stern, G.G. *Scoring Instructions and College Norms: Activities Index, College Characteristics Index.* Syracuse: Syracuse University, Psychological Research Center, 1963.

Stern, G.G. Characteristics of the intellectual climate in college environments. *Harvard Educational Review,* Winter, 1963a, 33, 5-41.

Stern, G.G. *Scoring Instructions and College Norms: Activities Index, College Characteristics Index,* Syracuse, New York: Psychological Research Center, 1963b.

Stern, G.G. Measuring noncognitive variables in research on teaching. In Gage, N.L. (Ed.). *Handbook of Research on Teaching.* Chicago: Rand McNally, 1963c.

Stern, G.G. and Steinhoff, C.R. *Organizational Climate Index, Form 1163.* Syracuse: Syracuse Psychological Research Center, 1963.

Stern, G.G. B=f(P.E.). *Journal of Projective Techniques and Person-*

ality Assessment, 1964, 28, 161-168.

Stern, G.G. Student ecology and the college environment. *Journal of Medical Education,* 1965, 40 (2), 132-154.

Summerskill, John. Dropouts from college. In N. Sanford (Ed.). *The American College.* Part 5: *627-657.* New York: Wiley and Sons, 1962.

Taxler, A.E. An appraisal of American colleges on the basis of men graduates listed in *Who's Who in America.* Paper presented at the metting of the American ,Association for the Advancement of Science Indianapolis, 29 December, 1957.

Taylor, Fredrick A. Institutional environmental factors that affect junior college faculty job satisfaction in selected public junior colleges of Texas. *Dissertation Abstracts,* 1968, 28 (10-A), 39-54.

Taylor, Harold. *Students Without Teachers: The Crisis in the University.* New York: McGraw-Hill, 1969.

Thistlethwaite, Donald L. College environment and the development of talent *Science,* July 1959, 13, 71-76.

Thistlethwaite, D.L College press and student achievement. *Journal of Educational Psychology,* October 1959a, 50, 183-191.

Thistlethwaite, D.L. College press and changes in study plans of talented students. *Journal of Educational Psychology,* 1960, 51.

Thistlethwaite, D.L. Fields of study and the development of motivation to seek advanced training. *Journal of Educational Psychology,* April 1962, 53, 53-64.

Thistlethwaite, D.L. Rival hypotheses for explaining the effects of different learning environments. *Journal of Educational Psychology,* 1962a, 53, 310-315.

Thistlethwaite, D.L. Diversities in college environments: implications for students selection. In K.M. Wilson (Ed.). *Research Related to College Admissions.* Southern Regional Education Board, Atlanta, Georgia, 1963.

Thistlethwaite, D.L. Recruitment and the retention of talented college students. U.S. Department of Health, Education, and Welfare Cooperative Research Projects 657 and 657A. Nashville Tenn.; Vanderbilt University, 1963a.

Thistlethwaite, D.L. Effects of college upon student aspirations. U.S. Department of Health, Education, and Welfare Cooperative Research Project No. D-098. Nashville, Tenn · Vanderbilt University, 1965.

Thistlethwaite, D.L. and Wheeler, N. Effects of teacher and peer subcultures upon student aspirations. *Journal of Educational Psychology,* Feb. 1966, 57, 35-47.

Usher, Richard H. A relationship of perceptions of self, others, and the helping task to certain measures of college faculty effectiveness. *Dissertation Abstracts,* 1967, 28 (5-A), 1713-1714.

Vexliard, Alexandre. Autoplastic et alloplastic. (Autoplasty and alloplasty), *Psychologia: An International Journal of Psychology in the Orient,* 1967, 10 (2), 58-68.

Visher, S.S. Scientists starred 1903-1943. In *American Men of Science,* Baltimore: Johns Hopkins University Press, 1947.

Voss, Donald H. The relationship of environmental change to student performance and attrition. *Dissertation Abstracts,* 1967, 28 (2-A), 790-791.

Walberg, H.J. and Anderson, G.J. Classroom climate and individual learning. *Journal of Educational Psychology,* 1968, 59, 414-419.

Walberg, H.J. Predicting class learning. A multivariate approach to the class as a social system. *American Educational Research Journal,* 1969.

Walberg, H.J. The social environment of learning as a mediator of classroom learning. *Journal of Educational Psychology,* 1969a.

Walberg, H.J. Class size and the social environment of learning. *Human Relations,* 1969b.

Walberg, H.J. A model for research on instruction. *School Review,* 1969c.

Walberg, Herbert J. and Ahlgren, Andrew. Predictors of the social environment of learning. *American Educational Research Journal,* 1970, 7 (2), 153-167.

Wallace, W.L. *Student Culture: Social Structure and Continuity in a Liberal Arts College.* Chicago: Aldine, 1966.

Warnath, C.F. and Fordyce, H.R. Inventoried values of entering college freshmen. *Personnel Guidance Journal,* 1961, 40, 277-281.

Webb, Doris J. An analysis of environmental press as perceived by sixth-grade pupils. *Dissertation Abstracts,* 1967, 28 (6-A), 2105.

White, W.F. and Anderson, H.E., Jr. A study of scaled dimensions of teacher behavior as perceived by students. *Journal of Psychology,* 1967, 65, 223-232.

Yinger, J.M. Research implications of a field view of personality. *American Journal of Sociology,* 1963, 68, 580-592.

Yonge, George D. Personality correlates of the college and university environment Scales. *Educational and Psychological Measurement,* 1968, 28 (1), 115-123.

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The Role of Education in Modernization of Two Tribes of Chotanagpur[1]

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This study was undertaken to find out the role of education in the modernization of two tribes of Bihar—the Munda and the Oraon. The findings reveal that the educated tribesmen, as compared to the uneducated ones, are more mobile spatially, occupationally and socially. Their emphatic capacity has increased and they are capable of choosing new individuals, roles and situations, and partcipating in socio-economic and political activities. Education has also made the tribesmen more competent to take interest in public matters and to express opinions thereon.

Before discussing the role of education in modernization of the two tribes it would be desirable to define what modernization and education mean for the purpose of this study.

While defining modernization, it is necessary to take into account the definition of tradition also because both are interlinked. One cannot discuss either in isolation. "Tradition means habits, customs, attitudes, ways of life which get embodied in institutions and then tend to get frozen because of the stability and autonomous existence of these institutions. Thus tradition implies age and, with it, a fairly long period of continuity. It also postulates a certain rigidity that makes adjustment to changing conditions difficult, if not impossible, without the stimulus of some external forces." (Rao, 1965). It is also "the cumulative heritage of a society which permeates through all levels of social organization, for example, the value system, the social structure and the structure of personality." (Singh, 1965).

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"Modernization", on the other hand, "is essentially a process—a movement from a traditional order to certain desired types of technology and associated forms of social structure, value orientation and motivations and norms.... Modernization thus is not just superficial acquisition of some isolated traits and elements characteristic of the more advanced countries. Their selection in a logical order and sequense, and integration into the cultural pattern in a widely ramifying manner is essential. A great deal of value-change is involved, and some significant institutional modifications are essential." (Dube, 1967).

In the words of Rangachari, "Modernity should imply a new set of values.... (and) development of a humanist and rational approach." (Rangachari, 1965). Modernization, for the purpose of this study, can be defined as an integrated and complex whole which consists of mobility, empathy, rational choice of new individuals, roles and situations, socio-economic and political participation, and media of mass communication.

Education

Education in the tribal areas has not shown much progress. The content of education is such that it does not impart any substantial knowledge. Most of the people who attend school at one time or the other discontinue their studies after a few years of schooling. Thus, though they claim to have attended school, their education is not functional. Only those who have had at least seven to eight years of schooling have been able to derive some benefit from their education. For the purpose of this study those who have had more than five years of schooling have been considered as educated, and those having less than five years of schooling have been considered as uneducated.

Indices of Modernization

Dube, drawing his material from a vast array of data presented by various authors, has given the following indices of modernization: "Empathy; mobility; high participation; interest articulation; interest aggregation; institutionalised political competition; achievement orientation; rational end-means calculation; new attitudes to wealth, work, savings and risk-taking; faith in the desirability and possibility of change; social, economic, and political discipline; and capacity to put off immediate and short-run satisfactions for higher satisfactions in the longer run. (Dube, 1967). But, in view of the limitations in time and resources, it was not possible to study all the above twelve indices of modernization. Therefore, the following five indices were selected for this study: mobility; empathy; rational choice of new individuals, roles and situations; socio-economic and political participation; and media of mass communication.

Purpose of the Study

The tribal societies have been studied from various angles and with different perspectives. But studies in the field of education among them have been very few. The study of the role of education in ushering in socio-economic changes and modernization has not received any attention. There has been no study on this aspect of education in any of the tribal areas of India. The purpose of the present study was to make a beginning in this field and to find out the role of education in modernization of the two numerically dominant tribes of Chotanagpur—the Munda and the Oraon.

Objective of the Paper

The objective of this paper is to show how acquisition of education has made the people geographically, occupationally and socially mobile; enabled them to imagine themselves in the roles and situations of other people, that is, made them empathic; made them competent to choose rationally new individuals, roles and situations; made them participants in the social, economic and political affairs of not only their villages but of the country; and has exposed them to the various media of mass communication. The educated, with the acquisition of these attributes, are moving from a traditional to a modern society. The uneducated, on the other hand, lack all these attributes of modernization. They are still anchored to their traditional moorings and do not show any sign of moving towards modernization.

The Sample Area

The area of study was Ranchi district in the Chotanagpur division of Bihar. It is one of the predominantly tribal districts of Chotanagpur with 61.6 per cent tribal population. 73.95 per cent and 76.83 per cent of the total population of the Munda and the Oraon in Bihar is concentrated in this district. So Ranchi was selected for this study.

In the district of Ranchi the Munda are heavily concentrated in Khunti sub-division and the Oraon in Gumla sub-division. Therefore a sampling of these two sub-divisions was made.

In the Khunti sub-division three villages, Kadma, Anigara and Sembhukel, and in Gumla sub-division also three villages, Chainpur, Bindaura and Kurkel, were selected.

The Sample Tribes

The Munda and the Oraon are two numerically predominant and somewhat developed tribes of Chotanagpur. They live in contiguous areas but speak two different dialects of two different families of languages. The Mundas are the earliest settlers of the Chotanagpur plateau. The Oraon having migrated from Konkan came to Chotanagpur and settled there much later. Both the tribes are settled agriculturists and live in identical ecological conditions. Their material culture is very simple and, at times, they live together in the same village. Educationally also, both of them are at par. In Bihar the percentage of literacy among the Munda is 13.81 per cent, and among the Oraon, 12.69 per cent. The literacy in the sample villages is 27.40 per cent among the Munda and 27.14 per cent among the Oraon. The respondents of the two tribes gave almost identical responses to the questions on the various indices of modernization. The findings of this study, therefore, may be taken to be applicable to both of them unless otherwise mentioned.

The Sample Respondents

Most of the undergraduate Munda and Oraon students reading in colleges of Ranchi, Khunti and Gumla were selected for the study. From Ranchi were selected both Munda and Oraon students; from Khunti, Munda, and from Gumla, Oraon students. A total of 140 Munda and 116 Oraon students were selected.

Further, two groups of adult respondents, both educated and uneducated, from the Munda and the Oraon were selected. The first group comprised 20 per cent Munda and Oraon adults from the six sample villages. This came to a total of 18 Munda and 40 Oraon adults. Out of the 18 Munda respondents, seven were educated and 11 uneducated, whereas, out of the 40 Oraon respondents nine were educated and 31 uneducated. In the second group, there were 18 educated and 20 uneducated Munda, and 17 educated and 33 uneducated Oraon, that is, a total of 88 respondents. Case histories were collected from the latter group of respondents. Thus, in all, 196 Munda and 206 Oraon respondents were selected for this study.

Tools and Techniques

Interview schedules and questionnaire containing questions on the various indices of modernization were administered to college students and educated adults from the sample villages.

Besides, case histories were collected from 88 educated and uneducated adults from the sample villages.

Participant and non-participant observations were also made to collect relevant data.

Most of the primary data on mobility, empathy, rational choice of new individuals and roles, participation, and media of mass communication were collected with the help of these tools. Some of the data collected were cross-checked with published reports, gazetteers, and other records.

FINDINGS

Mobility

Ever since the advent of education to these tribal areas there has invariably been social mobility among them, as we will presently see. Traditionally accepted social positions are no longer secure and education is rapidly becoming an instrument, stronger than any other traditionally instrument, for attaining social mobility. Education is also gradually replacing other resources of attaining mobility. "Education is now the most important agency whereby a young man with ability but limited resources can rise from the class of his parents." (Merrill, 1961). Another reason of education leading to social mobility is the social image formed in the minds of the uneducated tribesmen. They have associated education with high position in society, great wealth, power, prestige and the capacity of earning money without doing any manual labour. An illiterate cultivator cannot think of identifying himself with that image.

Traditional social institutions in tribal Chotanagpur, as they are, afford very little opportunity for any spatial and social mobility. They ordain that men should conform to their traditional occupations, follow and obey the codes of behaviour prescribed by the institutions, and remain attached to the soil. By going to urban areas men are considered to have been spoilt by picking up the vices from the scum of the urban communities. But an educated young man who reads newspapers, listens to radio, sees films and knows about the world, is aware, and even convinced, that so long he remains immobile in his traditional village he will cultivate his fields for the whole of his life and 'rot'

TABLE 1

Geographical Mobility

Orbit of Mobility	*Educated N=30*	*Uneducated N=58*
Not gone outside the village	0.0	5 (8·6)
Gone outside the village	9 (30·0)	36 (62·1)
Gone outside the State	21 (70·0)	17 (29·3)

there. His soul rebels at these constrictive injunctions imposed by his society and he makes every endeavour to free himself from this suffocating atmosphere and run away to the freer environment of the town where he is unconcerned with these injunctions, where lack permitting he finds a satisfaction of his desire for upward social mobility which in his traditional village he is incapable of getting.

Though both the educated and uneducated are mobile, yet the orbit of mobility of the educated is much greater than that of the uneducated. As much as 70% of the educated have gone outside the state while only 29% of the uneducated have done so.

Since the educated are now spatially mobile, they go for urban professions and thus are occupationally more mobile than their illiterate parents and counterparts. People, in general, also consider that the proper place of the educated persons is in town where they can get suitable jobs. The parents have now a clear conception of the hierarchy of occupations available in the towns generally accepted by the society. A parent considers it a waste of time and money if an educated son returns to the village to cultivate land. But such a parent is perhaps not destined to see such a gloomy day. He is going to be spared such an ignominious situation, for, his educated son himself abhors cultivation.

Occupational Mobility

Educaton has led to a shift in the occupation of the Munda and the Oraon. The traditional occupation of these tribes is agriculture. But the educated section of the tribe does find this occupation satisfying. Men, and even women, who have received even middle school education are constantly mobile in search of occupations other than agriculture. An educated young man now prefers to do a menial's job than to cultivate his land. Education has come to be associated with urban occupation which means urban residence. Even the parents do not like their educated children to continue to till the soil after getting education. They consider it as waste of time and money spent on their children's education.

The respondents attached different values to different occupations. Many of them correlated cultivation with illiteracy. Respondent after respondent said, "Those who are illiterate will have to depend on agriculture", and "The educated people feel shy and are ashamed of cultivating their land and tending their cattle because these work are not prestigious." Those educated young men who could not get any job in town and continued with their cultivation were looked down upon. The respondents also related lower standards of education with petty jobs and higher standards of education with respectable and well-paid jobs. A parent whose son has passed only higher secondary examination would be satisfied with 'any job in the town,' whereas one whose son is highly educated would like him to become a doctor, or engineer or lawyer. For the people the educational-occupational relation is fairly established and accepted. And when one moves from rural to urban professions the society undoubtedly considers one occupationally mobile.

Social Mobility

Socially also an educated Munda or Oraon is more mobile than his uneducated parents or counterparts. Due to education and the consequent occupational mobility he is able to achieve a tolerably good social status in the eyes of his village people. He may or may not be given any social recognition or prestige in the urban areas, where, compared with the permanent non-tribal people, he has not attained the required social norms, but in his own village he is definitely at a place superior to his illiterate fellow-villagers. The more fact of his urban residence, earning cash money, and not doing manual labour, is enough to raise his status image in the eyes of the uneducated villagers.

But social mobility has another aspect also. While trying to be socially mobile, the two tribes are moving away from an ascriptive, established and homogeneous society to an achieving, adaptive and heterogeneous society. In the ascriptive society they remained loyal to the kin and clan groups and were oriented towards a corporate village life. But in the achieving society towards which they are now moving they have to adapt themselves to newer codes of behaviour and ethics.

With the social mobility among the educated has come a desire to acquire cash and use them on modern things. When asked, 'what would you do if given Rs. 500?' the educated said that they would buy a cycle, or a watch and such other things. The uneducated, on the other hand, were first astonished to hear such a proposition. They could not say what they would do with the money. When further pressed they said, they would 'purchase land' or 'just keep it'. Thus with social mobility have also come various types of socio-economic changes and changes in the value systems of the two tribes.

Empathy

When an educated Munda or Oraon moves out of his traditional village, life-ways, and thought-ways, and goes to an urban setting, he is called upon to re-orient his whole outlook on life. He is to adjust himself to a new environment and assume newer roles. He has to look much beyond his traditional constructive sphere and identify himself with new choices and new situations. This capacity of seeing oneself in others' situations and roles is defined as empathy. It is "the power of projecting one's personality into (and so fully comprehending) the object of contemplation." Empathy is one of the chief characteristics of a mobile individual and an index of modernization. Empathic conditions and feelings are found only in a modern society.

"Since empathy is an autonomous personality behaviour, it is not revealed by any census data, but must be elicited through psychological testing of individuals." (Lerner, 1962). In order to test the empathic capacity of the respondents their case histories were collected, and their attitudes were elicited through them. Projective questions were also used to elicit their responses.

One of the main characteristics of an uneducated, a tradition-oriented man is his inability to ask the question why, whereas an educated individual is quite capable of posing this question to himself and providing a rational answer.

When asked, "Where would you live if due to some reason you have to leave your village?", the educated and uneducated showed a sharp cleavage in their reaction to the question. To the uneducated Munda and Oraon the question came as a shock. They were happily living in the village and, in spite of certain deprivations, had no intention of leaving it. Almost all of them refused to leave the village of their ancestors, where they were born and brought up and where—it would only be proper—they ought to die. They could not visualize themselves in an unfamiliar situation. Their moorings in their traditional village were so deep that they were not prepared to move out of it even for a better living. The educated Munda or Oraon, on the other hand, did not show any amazement at the question. They considered it a feasible proposition and were prepared to leave the village mostly for urban areas.

The empathic capacity of the uneducated and educated can be judged from their responses to the above projective question. This is what an uneducated cultivator had to say: "I was born in this village and intend to die here. Where else can I go? I shall live here. Even if I am forced to go elsewhere I cannot go. How can I earn my living at any other place where I have no land? In town I will have to beg for rice."

Compare it with the response of an educated respondent. "I have seen both towns and villages, and I prefer to live in a town because the modern amenities such as library, radio, electricity, school and hospital are available there. If I am to leave my village I will go to a town, find a job and live there."

The uneducated finds it difficult to visualize himself in a different role and situation, whereas the educated is not concerned at leaving his village. He thinks he is capable of adjusting and adapting himself to the new role and situation.

Similarly, the uneducated respondents were not prepared to become a leader at any level. They could not visualize themselves in such unfamiliar and strange roles. They showed a consistent inferiority complex which appeared to be the result of their being uneducated and 'not living in the company of the educated.' The response to the question whether they would like to become the Chief Minister of Bihar showed a sharp cleavage in the empathic capacity of the educated and uneducated respondents. Most of the educated respondents were willing to become the Chief Minister of Bihar. Among the Munda, 65.21% expressed their willingness as against 34.79% who did not. Among the Oraon, 54.46% were willing and 45.54% were not willing.

The responses of the uneducated were drawn from their case histories. They showed positive disinclination to become the Chief Minister of Bihar. Many shuddered at this idea. Many could not even 'think' to be so—not even in their dreams. To some it was a preposterous proposition, others thought it was outrageous, while still others thought we were joking with them. A cultivator to become a Chief Minister, impossible! It was as impossible for them to become the Chief Minister, as it was for the Chief Minister to become a cultivator. The educated tribesmen, on the other hand, did not show any surprise at the possibility of their becoming the Chief Minister of their State. In fact, some of them considered themselves to be already a leader of the village. Some even considered themselves better and more suitable than some of the present leaders. Many educated respondents could project their identities into the other object (the Chief Minister). They showed a much higher empathic capacity which the uneducated completely lacked.

The projective questions asked to elicit the empathic capacity of the respondents involved role playing situations. It was found that an uneducated respondent was not only unprepared to play the roles of unknown persons in unknown situations but he was also reluctant even to imagine himself playing those roles. He lacked completely the psychic mobility so clearly evinced by the educated respondent. He not only did not show any psychic mobility, he was not even prepared for physical mobility.

Rationality

A modern society is necessarily rational. Lerner, while discussing the necessity of rationality in a mobile, that is, modern society says, "A mobile society has to encourage rationality, for the calculus of choice shapes individual behaviour and conditions its rewards. People come to see the social future as manipulable rather than ordained and their personal prespects in terms of achievement rather than heritage. Rationality is purposive: ways of thinking and acting are instruments of intention (not articles of faith); men succeed or fail by the test of what they accomplish (not what they worship). So, whereas traditional man tended to reject innovation by saying 'It has never been thus', the contemporary Westerner is more likely to ask

'Does it work?' and try the new way without further ado." (Lerner, 1962).

When a modernizing individual gains mobility he develops the empathic capacity of imagining and identifying himself with new individuals, roles and situations. The new circumstances under which he is placed afford him ample opportunities to develop rationality, and the choice of the new roles that he makes during the process of his modernization are based on rationality and not on any preconceived notions. An uneducated Munda or Oraon works by consensus and in a group situation; and educated by individual opinion and without much regard to traditional kin and clan affiliations.

This difference between the traditional and the modern man in using rationality depends on his education. It is education that makes a man use his rationality. It also sharpens his faculty of reasoning and enables him to examine the various pros and cons of a new idea or situation before accepting it. The uneducated lacks this faculty. An illiterate respondent remarked, "We illiterate are no better than our bullocks. We do not think."

Tables 2 and 3 show how rational or irrational the respondents were in choosing new tools and individuals. The responses again conform to the trend that has emerged in case of other attributes of modernization.

TABLE 2

Use of New Tools and Implements by Uneducated Munda and Oraons

Tribes	*Use*	*Do not use*
Munda N=85	20 (23·5)	65 (76·5)
Oraon N=126	24 (19·0)	102 (81·0)
Total N=211	44 (20·8)	167 (79·2)

The above responses were from the uneducated Munda and Oraon. As many as 79.2% did not use new tools and implements. The reasons given by them for not using them were, 'they are bad', 'they are distributed by government', 'they spoil the land', and the like. It is obvious that none of the reasons given above is rational.

TABLE 8

Use of Fertilizer by the Educated Munda and Oraon and Reasons for Using It

Use of Fertilizer			*Reason for Using It*	
Tribes	*Use*	*Do not use*	*Tribes*	*Gives better yield*
Munda N=124	89 (71·77)	35 (28·23)	Munda N= 86	82 (95·35)
Oraon N= 80	73 (91·25)	7 (8.75)	Oraon N= 72	67 (93·05)
Total N=204	162 (79·41)	42 (20.59)	Total N=158	149 (94·3)

The above responses were obtained from the educated respondents who had caused fertilizers to be used in their cultivation fields.

Most of the steps taken for the development of the tribes meet with indifference from the uneducated persons because they do not rationally analyze the respective advantages or disadvantages of the steps taken and innovations introduced. The use of fertilizer in the tribal areas is a case in point. The uneducated villagers do not use it, and for this they give irrational reasons like, 'it spoils the land', 'our cowdung manure is better', 'we cannot afford to buy it every year', and the like. The educated cultivators, on the other hand, not only use it but use it for rational and valid reasons. 94.30% of such educated cultivators who use it do so because it gives better yield.

When people come into contact with new people it is but natural to expect that they would either like or dislike them. If they like them then it would indicate that they want to adjust with them, and if they dislike them there would be an attempt of avoidance. 94.47% of the educated respondents reported that they liked new people whom they met, and they also reported that the new people whom they met also liked them. With mutual liking and adjustments, a sense of universalism thus grows among the educated respondents.

When an educated Munda or Oraon accepts a new idea or situation he does so after using his rationality. He knows and understands why he is doing so. An uneducated person, on the other hand, does not accept a new thing mainly because the same has not been ordained by his tradition and it did not exist in his culture. An unknown fear haunts his mind as regards accepting any new thing about which he has no knowledge and which he has not tried. Education gets over this psychic gap between the two sets of individuals. The educated, when confronted with new individuals, roles or situations, tries to understand them and make adjustment with them. His education makes him conscious of the fact that in the changing society where new ideas and things are rapidly taking roots he will have to take them sooner or later. The uneducated does not gather courage to face the new individuals, roles or situations. He feels more comfortable when he does not have to face them. But he does so simply because he does not know that it is only self-delusion and he cannot avoid facing the new individuals, roles or situations by not looking at them.

Social Participation

Responses of the educated respondents were elicited through questionnaires regarding their participation in the social affairs of the village or the community. It was seen that most of them did participate in the marriage and death rites of a fellow villager and in other social functions. 88.41% educated Munda and 88.70% educated Oraon respondents did participate in such social functions, as against 11.59% Munda and 11.30% Oraon who did not. The uneducated, on the other hand, were completely indifferent to such participation. On such occasions most of them showed a marked lack of interest in the social activities of the village.

Economic Participation

It was seen that the educated Munda and Oraon took effective part in the programmes of economic development of the village through the agencies of cooperative societies. A large number of educated respondents participated in the working of these societies. 52% Munda, 74% Oraon—that is, a total of 62% educated respondents—participated. The uneducated, on the other hand, did not bother or care about such agencies aimed at economic development of their villages. Many of the uneducated Munda and Oraon even did not know that any cooperative society existed in their villages.

Political Participation

An educated Munda or Oraon is also quite conscious and aware of the political rights and responsibilities that are conferred on him. He makes full use of them. He casts his votes for individuals, parties, relatives and persons with whom he has any attachment. He is so much involved in the political affairs of the country that he not only participates in them by exercising his rights of voting, but also wants to have some say in the political affairs. 70.76% of the educated Munda and 60.07% of the educated Oraon respondents reported that they were aware of their voting rights.

The uneducated persons present a contrasting picture. They even do not know what is meant by voting. For many of them it is just an 'order from the government' which they have to obey, for others it is a useless exercise because it does not bring any benefit to them. They are never keenly interested in the political affairs of the village or the state. Their participation is only nominal and half-hearted, and is limited only to the extent of 'dropping the ticket in the box.'

Expressing an Opinion

An educated Munda or Oraon not only participates in the socio-economic and political affairs of the village, state and country, but he also expresses an opinion on these matters. Education has enabled him to judge the various aspects of the affairs affecting the wider public. He holds and expresses opinions on the relative merits and defects of the various socio-political institutions in his society. The uneducated, as usual, is not concerned with matters that do not directly concern him. He is too busy with his cultivation and other means of earning his livelihood to know about matters of public interest, participate in them and have any opinion on them. His lack of participation and his inability to express an opinion tend to confine him to his traditional ways of behaviour. Even when he does not participate in the social, economic and political affairs of the village and does not hold or express opinions on matters of public interest, he does not try to improve his performance in these fields. There is no motivation for him. He does not wish to rise above his present level.

Media of Mass Communication

The different media of mass communication have been universally regarded as great catalytic agents for bringing about social change and modernization. Except the newspaper, their greatest advantage is that both the enlightened and the ignorant, the highly educated and the illiterate, can derive benefit from them. They bring the most valuable material information. As a respondent said, "The radio brings the whole world to my door." Mass media are also a strong stimulant to the people of a developing country. And this is truer in case of the tribal people under study. Without the mass media people remain inert.

The Munda and the Oraon villages are still equipped with the same traditional means of communication which the inhabitants used hundreds of years ago. News and information still pass through words of mouth. The efforts hitherto made in this direction leave much to be desired. There is hardly any programme for the development of communication channels in their villages. No bulletins, charts, posters depicting policies and programmes of the government could be seen in the villages. Heavy percentage of illiteracy prevents the Munda and the Oraon, like other tribesmen, to go for newspapers. The economic condition of the tribes is not such as to allow them to buy radio sets. Community listening radio sets have never worked well in the village. And the people never get a chance to see film because it is not accessible to them either physically or economically.

The Newspaper

For the purpose of this study only three media of mass communication were studied: the newspaper, the radio and the film. The educated Munda and Oraon are regular readers of newspapers. Table 4 shows the frequency of their reading newspaper. More than half of them read newspapers daily.

TABLE 4

Frequency of Reading Newspapers

Tribes	*Daily*	*Several Days a Week*	*Weekly*	*Occasionally*	*Rarely*
Munda N=135	71 (52·59)	30 (22·22)	15 (11·11)	13 (9·62)	6 (4·46)
Oraon N=110	61 (55·45)	22 (20·00)	9 (8·18)	17 (15·45)	1 (0·92)
Total N=245	132 (53·87)	52 (21·22)	24 (9·79)	30 (12·24)	7 (2·88)

So far as reading or having an interest in newspapers is concerned, the educated and the uneducated persons are poles apart. The educated Munda and Oraon not only read daily, weekly and monthly newspapers and .magazines, but also participate in discussions on the various types of news published in them. The advantages they derive are immense. Their interest in newspapers goes beyond the linguistic and national frontiers. Their interests are varied; they read various types of newspapers as given in Table 5.

TABLE 5

Titles of Newspapers Read by the Educated Munda and Oraon

Newspapers	*Munda N=116*	*Oraon N=139*	*Total N=255*
The Indian Nation	100 (71.94)	92 (79.31)	192 (75.29)
The Aryavarta	90 (64.75)	71 (61.21)	161 (63.14)
The Statesman	30 (21.58)	24 (20.69)	54 (21.18)
The Searchlight	15 (10.79)	35 (30.17)	50 (19.61)
The Ranchi Express	12 (8.63)	10 (8.62)	22 (8.63)
The Hindustan Times	9 (9.47)	11 (9.48)	20 (7.84)
The Times of India	9 (6.47)	10 (8.62)	19 (7.45)

Note : Many respondents gave more than one response.

Radio

The reactions of the educated and the uneducated Munda and Oraon respondents were again diametrically opposite with regard to listening to or owning a radio. The former knows all that is to be known about the radio. He is a regular listener. If he does not own a radio he makes it a point to go somewhere else and listen to it. His interest is diverse. He listens to different radio stations and different types of programmes as is evident from Tables 6 and 7.

TABLE 6

Radio Stations Listened to by the Educated Munda and Oraon

Radio Stations	*Munda* *N=83*	*Oraon* *N=91*	*Total* *N=174*
Vividh Bharati	36 (43.37)	52 (57.14)	88 (50.57)
A. I. R., Ranchi	41 (49·40)	45 (49.45)	86 (49.43)
Radio Ceylon	34 (40.96)	48 (52.75)	82 (47.13)
A. I. R., Delhi	26 (31.33)	39 (42·86)	65 (37,36)
B. B. C.	12 (14.46)	10 (10.99)	22 (12.64)

Note : Many respondents gave more than one response.

TABLE 7

Types of Programmes Listened to

Types of Programmes	*Munda* *N=83*	*Oraon* *N=91*	*Total* *N=174*
Film music and songs	39 (46·99)	54 (59·34)	93 (53.45)
News bulletins	25 (30.12)	39 (42.86)	64 (86.78)
Speeches by leaders	29 (34.94)	34 (37.36)	63 (36.21)
Classical music and songs	26 (31.33)	35 (38·46)	61 (55.06)
Political commentaries	20 (24.10)	31 (34.07)	51 (29.31)
Radio newsreel	18 (21.69)	29 (31.87)	47 (27.01)
Debates in Parliament	18 (21.69)	25 (27.47)	43 (24.71)

Note : Many respondents gave more than one response.

An educated Munda or Oraon thus shows all the signs of his exposure to this medium of mass communication. He does not fail to take advantage of it and considers it as a powerful instrument of modernization. The uneducated, on the other hand, is aloof, disinterested and even antagonistic to the radio. He considers it of no use to him as he is a cultivator and an illiterate. What to speak of buying a set, he is not even prepared to take it free of cost. The uneducated Munda and Oraon are not exposed to this medium of mass communication and hence could not be expected to take any advantage from it directly or through those who owned radio sets and listened to the programmes.

The Cinema

The difference between educated and uneducated persons so far as their exposure to films is concerned is enormous The educated one makes it a point to see films whenever possible and takes advantage from them. He is interested in various types of films and sees educational, social, religious and political films in that order of preference. Table 8 gives the details of his preference for different types of films.

TABLE 8

Types of Film Seen by the Educated Munda and Oraon

Tribes	*Educational*	*Social*	*Religious*	*Political*
Munda N=140	76 (54.29)	60 (42.86)	29 (20.71)	19 (13.57)
Oraon N=116	69 (59.48)	51 (43.96)	43 (37.07)	21 (18.10)
Total N=256	145 (56.64)	111 (43.36)	72 (28.13)	40 (15.53)

Note : Many respondents gave more than one response.

An educated Munda or Oraon is quite aware and conscious that the film is a useful medium for his as well as for his society's modernization. Though he is also aware of the damaging influence of some particular types of films, yet he thinks that the educated persons would be capable enough to glean the good qualities of the films and discard the bad ones. The uneducated avoids films as far as possible. It is typical of him to denounce all types of films without ever seeing any of them. His opinion is based on mere hearsay. As he does not see films, he cannot understand how films can be instrumental in his development. But the indiscreet copying of the manners, etiquettes, scenes and dialogues of films by the young men and women has left an undelible imprint on his mind and it is difficult to erase that impression. But it will be in his own interest if he exposes himself to these media of mass communication. This will have a double advantage. An increased exposure will not only take him to the road of modernization but will also make him better aware of the government policies and programmes aimed at his development, as, "Widening of channels of communication will make the rural villagers better aware of the government services that are available to them and will encourage them to play a more active role in their dealings with local, provincial, and national government." (Holmberg, 1960).

CONCLUSIONS

It is thus seen how education, itself being an index of modernization, acts as the prime mover of all other indices of modernization and what role it plays in modernizing the Munda and the Oraon individuals and their societies. In the social and economic reconstruction of their societies as a prelude to modernization, it is to be ensured that the people are greatly involved and participate in all such activities which aim at their modernization. For all these education is the most essential prerequisite. It is only with the help of education that the people become aware of their roles in the modernizing processes of their society.

It follows from what has been discussed above that if the Munda and Oraon are to be modernized they need to be given, first, a universal and mass education, the content of which will have to be such as to meet the requirements of modernization. We cannot but agree with the view of the Education Commission, 1964-66, that "To modernise itself, a society has to educate itself. Apart from raising the educational level of the average citizen, it must try to create an intelligentsia of adequate size and competence, which comes from all strata of society and whose loyalties and aspirations are rooted to the India soil."

REFERENCES

Dube, S.C. Modernization and its Adaptive Demands on Indian Society. In M.S. Gore, *et al.* (Eds.). *Papers in the Sociology of Education in India*. New Delhi: National Council of Educational Research and Training, 1967.

Government of India. *Report of the Education Commission, 1964-65,* New Delhi, 1966.

Holmberg, A.R. Changing Community Attitudes and Values in Peru: A Case Study in Guided Change. In *Social Change in Latin America Today*. New York· Vintage Books, 1960.

Lerner, D. *The Passing of a Traditional Society.* Glencoe: The Free Press, 1962.

Merrill, F.E. *Society and Culture: An Introduction to Sociology.* New Jersey: Prentice Hall, Inc., 1961.

Pool, I. de Sola. The Mass Media and Politics in the Modernization Process. In Lucien Pye (Ed.). *Communication and Political Development.* Princeton: Princeton University Press, 1963.

Rangachari, K. In A.B. Shah, and C.R.M. Rao (Eds.). *Tradition and Modernity in India.* Bombay: Manaktalas, 1965.

Rao, V.K.R.V. Some Problems Confronting Traditional Societies in the Process of Development. In A.B. Shah and C.R.M. Rao (Eds.). *Tradition and Modernity in India.* Bombay: Manaktalas, 1965.

Schramm, W. *Mass Media and National Development.* Paris: Unesco, 1964.

Singh, Y. Traditional Culture Pattern of India and Industrial Change. In A.B Shah and C.R M. Rao (Eds.). *Tradition and Modernity in India.* Bombay: Manaktalas, 1965.

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Predicting Higher Secondary School Success

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The authors report a study undertaken to investigate the prognostic value of middle school examination marks for success at the higher secondary examination. Other purposes were to obtain a prediction formula for streaming students entering the secondary stage, and to establish multiple cut-off scores in meaningful subjects for the three streams. The sample comprised 255 students from Class VIII (1963-64) and the criterion was their higher secondary examination marks (1967). The critical score for predictors was determined by calculating tetrachoric r's for different values of a predictor. The investigators found that the middle school examination marks have no predictive value for the commerce and humanities streams; for science, they are useful to some extent though not very efficient. The authors have worked out a key profile based on achievement scores in the subjects for various streams, which can readily help in the streaming of students.

A student's transition from middle school to higher secondary school is not easy. The hazards range from social and financial through the administrative, to the intellectual and emotional. They originate in the home and in the school. They are not unconnected with the vagaries of examinations and examiners. Central to these hazards is the problem of student selection/allocation. Each student on entering higher secondary school is called upon to choose one of the four groups, Literary, Scientific, Commercial or Technical, and elect a number of main and subsidiary subjects under the group chosen by him. And though school authorities strive towards a solution, this human problem defies, in the scientific sense, solution. It is a problem that has always been with us and, within some degree, remains with us. It has been brought to public attention by the sudden increase in student numbers, by the large incidence of failures in the external examination at the end of the higher secondary stage, even after changing the entrance requirements occasioned by the introduction of the public middle school examination in Delhi.

In the beginning of the present decade the students achieving high in the middle school examination were admitted to science--mathematics group, in the middle of the decade they were admitted to the science-biology group; and at the close of the decade they are seeking admission to the commerce group. However, this changing emphasis in terms of groups of subjects has little to do with the incidence of failure at the higher secondary examination. In these circumstances it is natural that attention should be centred on the prognostic value of the public middle school examination held by the Directorate of Education, Delhi.

PURPOSE

The major purpose of the study was to investigate the efficiency of marks (achievement measures) obtained in the middle school examination as predictors of higher secondary examination success. Another purpose was to obtain a weighted combination of some or all of the subject marks for a student, which would give the best prediction as to the individual's performance in the higher secondary examination for different streams—Humanities, Science and Commerce. The third purpose was to establish multiple cut-off scores for meaningful achievement tests for each stream.

PROCEDURE

The Sample

The base sample of 521 students reading in Class VIII in 1963-64 in five boys' secondary schools of Delhi, was selected. These five schools had approximately equal enrolment in Class VIII and represented the three levels of efficiency—good, average and below average—as judged from the last three years' results in the higher secondary examination. The sample was therefore as representative as possible.

A large base sample was selected because it gets attenuated as the students move from Classes VIII through XI. As Class VIII is the terminal state of elementary education, some students discontinue school to take up vocational training and some others on pecuniary grounds, but all students who join the Class IX also do not move as a group from one class to another. Those who fail to pass the annual examination are detained; some students migrate to other places due to the transfer of their parents; and some others leave school for want of courses of their choice. Further, a bigger sample could provide flexibility in establishing sub-samples according to courses offered by the students at the higher secondary stage: Humanities, Science and Commerce. Of the total sample in 1967, 255 students appeared at the higher secondary examination conducted by the Central Board of Higher Secondary Education, New Delhi. Of these, 41 were in the Humanities stream, and 138 and 76 students were in the Science and the Commerce streams, respectively. The marks of the Middle School Examination, 1964, and the marks of the Higher Secondary Examination, 1967, were obtained from the examining authorities directly.

Middle School Examination Result

The predictors for this study were the marks obtained in individual subjects as well as the aggregate marks in Middle School Examination of 1964. The maximum marks for the examination were 1,100, of which 200 marks were allotted to English, and 150 marks to each of the six subjects: (i) Hindi, (ii) mathematics, (iii) social studies, (iv) general science, (v) Sanskrit, (vi) drawing/craft. To pass the examination, a student needed 33% (363) marks, both in the aggregate and in each individual subject offered. A student who passed the middle school examination qualified for admission to Class IX of higher secondary school.

Higher Secondary Examination Result

The criterion chosen for this study was the Higher Secondary Examination result of 1967 The maximum marks for the examination were 800, of which English (200 marks) was compulsory. In the Humanities stream a student was required to offer compulsory Hindi carrying 150 marks and any three from the optionals—history, civics, economics, lower mathematics, Sanskrit, geography, art, each carrying 150 marks.

In the Science stream a student offered physics, chemistry, mathematics and biology (or mechanical drawing), each carrying 150 marks.

In the Commerce stream, a student offered Hindi, commerce, economics and geography or lower mathematics, each carrying 150 marks.

To pass the examination, a student needed 33% (264) marks, both in the aggregate and in each individual subject offered.

In order to obtain an idea as to which tests would be useful in predicting the stream performance and the extent of prediction possible (the latter being the multiple correlation between the selected tests and the stream score) Wherry-Doolittle's procedure for test selection was followed.

For determining the critical score for the meaningful predictors, the tetrachoric *r*'s were calculated for different values of a predictor, while the criterion score, namely, the aggregate marks in the Higher Secondary Examination, was dichotomized at 33%, the percentage required to pass the examination. The predictor variable score which yielded the maximum value of tetrachoric *r* was regarded as the critical score for that predictor. The critical score profiles for each stream were drawn.

ANALYSIS

Intercorrelations

The intercorrelations between subject marks achieved in the middle school examination and the criterion obtained by the use of the Pearson product-moment formula are given in Tables 1, 2 and 3 for Humanities, Science and Commerce streams respectively.

TABLE 1

Correlation Matrix : Humanities Stream

N=41

	Eng.	*Hindi*	*Maths.*	*Social Studies*	*General Science*	*Sanskrit*	*Drawing*	*Total*	*Criterion*
English	—	.366	.606	.422	.221	.264	-.004	.668	.177
Hindi		—	.410	.476	.294	.335	.082	.539	.090
Maths.			—	.290	.342	.080	.050	.596	.040
Social Studies				—	.237	.349	.305	.652	.140
General Science					—	.427	.185	.544	-.203
Sanskrit						—	.191	.627	.047
Drawing							—	.472	.143
Total								—	.096
Criterion									—

TABLE 2

Correlation Matrix : Science Stream

N=138

	Eng.	*Hindi*	*Maths.*	*Social Studies*	*General Science*	*Sanskrit*	*Drawing*	*Total*	*Criterion*
English	—	.217	.643	.337	.441	.343	-.028	.728	.467*
Hindi		—	.358	.307	.324	.362	.203	.568	.109*
Maths.			—	.353	.401	.246	.101	.742	.349*
Social Studies				—	.538	.546	.330	.565	.139
General Science					—	.557	.375	.638	.138
Sanskrit						—	.427	.613	.245*
Drawing							—	.397	.096
Total								—	.425
Criterion									—

* Significant at 5% level

TABLE 3

Correlation Matrix : Commerce Stream

N=76

	Eng.	*Hindi*	*Maths.*	*Social Studies*	*General Science*	*Sanskrit*	*Drawing*	*Total*	*Criterion*
English	—	.186	.351	.297	.421	.180	.027	.558	.091
Hindi		—	.407	.330	.496	.291	.157	.593	.193
Maths.			—	.291	.525	.240	.081	.680	-.046
Social Studies				—	.500	.368	.142	.611	.143
General Science					—	.555	.315	.855	-.050
Sanskrit						—	.394	.706	.074
Drawing							—	.458	.051
Total								—	.079
Criterion									—

From Table 1, it is noticed that the correlations of predictors with the criterion are low and even two coefficients are negative. Further, none of the coefficients is significant. The middle school examination marks, therefore, did not appear to be of value in predicting success for the Humanities stream of higher secondary education.

From Table 2, it is obvious that the correlations of predictors with the criterion are all positive, and five of them are significant too. English, Hindi, mathematics, general science appeared to be useful in predicting success for the Science stream of higher secondary education. The aggregate of marks obtained in the middle school examination was also predictive of success for the Science stream.

For Commerce stream, the situation was similar to that of the Humanities stream. From Table 3, it is seen that all the correlations with the criterion are low, two are negative, and none of them is significant. The middle school examination marks were, therefore, of little value in predicting success for the Commerce stream of higher secondary education.

Best Predictors

The contribution of tests towards the prediction of higher secondary examination success in the Science stream as also the extent of such prediction in terms of multiple correlation (corrected for sampling errors) is shown in Table 4.

TABLE 4

Multiple Correlation : Science Stream

No. of Predictors	*Multiple Correlation*	*Predictor Added*
0	—	—
1	.467	English
2	.474	Aggregate Marks
3	.493	Science
4	.493	Sanskrit

For the Humanities and Commerce streams, multiple correlations were insignificant: hence the middle school examination results were not predictors of success in the higher secondary examination.

Prediction Formulae

Regression equation employing best predictors was worked out for the Science stream only. From this regression equation the predicted achievement score may be obtained for an individual student. The regression equation is given in the standard score and raw score forms below.

Standard Score Form

$$\overline{Z}_{Sc} = 0{\cdot}588Z_{Eng} + 0{\cdot}390Z_{Agg} + 0{\cdot}211Z_{Sc}$$

Raw Score Form

$$\overline{X}_{Sc} = 3{\cdot}134X_{Eng} + 0{\cdot}480X_{Agg} + 1{\cdot}276X_{Sc} - 9{\cdot}981$$

Selection Of Stream

Any decision for selection of streams by the student is not possible on the basis of the predicted score as the middle school examination marks are not predictive of success in the Humanities and Commerce streams. However, for deciding whether to go into the Science stream or not, a simple procedure will be to find out the percentage of students in the class who fall below the student in question when they are ranked according to the predicted score. If a student obtains a percentile rank of 50 or more, he may choose the Science stream. Students getting a percentile rank below 50 may be advised not to join the Science stream.

MULTIPLE CUT-OFF SCORES

It has been noticed by various investigators[1] that important abilities required for success in a particular work were often omitted from the prediction equation. The key abilities did not appear in the prediction equation because homogeneity of the group on that ability reduced the size of correlation between these test scores and the criterion, and because the method of multiple regression weights permitted the possession of other abilities to compensate for a low amount of crucial ability. As Gaier and Lee point out, the multiple regression technique throws away much information because it yields a composite index. Hence the use of the 'Multiple Cut-off Method', which does not per mit such compensation of some abilities for others required by the work, is advocated.

The multiple cut-off method uses norms which are established in terms of minimum scores for each of the significant aptitudes. The cutting scores are set at the point which will provide maximum differentiation between the passing and failing students.

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[1] Donald L. Grant (Ed.). Validity Information Exchange. *Personal Psychol.,* 1955, 8 (1), p. 105; Albert Mapou, Development of General Working Population Norms for the USES General Aptitude Test Battery. *J. Appl. Psychol.,* 1955, 39 (2), 130-133; Eugene L. Gaier and Marilyn C. Lee, Pattern Analysis: The Configural Approach to Predictive Measurement. *Psychol. Bull.,* 1953, 50 (2), 140-148.

The cut-off scores for meaningful predictors, as also the value of tetrachoric *r* for each of them for the three streams are given in Table 5.

TABLE 5

Cut-off Scores and Tetrachoric r for Marks in Different Subjects

S. No.	*Subjects*	*Humanities*		*Science*		*Commerce*	
		Score	*r*	*Score*	*r*	*Score*	*r*
1.	English	41	.00	67	.24	57	.33
2.	Hindi	60	.00	58	.59	61	.77
3.	Mathematics	48	.40	45	.66	43	.34
4.	Social Studies	63	.47	67	.45	46	.41
5.	General Science	54	.04	52	.16	41	.77
6.	Sanskrit	51	.32	44	.66	38	.92
7.	Drawing	44	.39	54	.46	36	89
8.	Aggregate	396	.00	472	.43	353	.72

Streams and Meaningful Subjects

The curriculum for the three streams is as under.

HUMANITIES

Compulsory

1. English
2. A Modern Indian Language (Hindi, Urdu, Punjabi, Bengali, Tamil, Telugu, Gujarati, Marathi or Sindhi)

Optional

1. History
2. Civics
3. Economics
4. Geography
5. Classical Language (Sanskrit, Arabic or Persian)
6. Arts—One of the following :
   (a) Drawing

Compulsory	*Optional*
	(b) Painting
	(c) Music
	7. Mathematics or Mathematics (ordinary level) and Geometrical Drawing or Arithmetic and Domestic Science
	8. Physical Science or Physiology & Hygiene
	9. Domestic Science (for girls only)
	10. Agriculture
	11. Psychology
	12. A Modern Indian Language (Hindi, Urdu, Punjabi, Bengali, Tamil, Telugu, Gujarati, Marathi or Sindhi)
SCIENCE	
1. English	1. Physics
2. Mathematics	2. Chemistry
	3. General Biology or Physiology and Hygiene
	4. Agriculture
	5. Drawing (Geometrical and Mechanical)
	6. Domestic Science (for girls only)
	7. Geography
	8. Classical Language (Sanskrit or Arabic or Persian)
COMMERCE	
1. English	1. Geography
2. Commerce	2. History
3. Economics	3. Mathematics or Mathematics (ordinary level) and Geometrical Drawing
4. Modern Indian Lanauage	4. Classical Language
	5. Civics

From an analysis of the above curriculum it would appear that the more meaningful subjects for the Humanities stream would appear to be the languages (English, Hindi) and social studies. English, mathematics, general science would appear to be most meaningful for the Science stream; and English, mathematics and social studies for the Commerce stream. Besides these, the general level of achievement as indicated by aggregate marks is considered meaningful for all the streams.

From Table 5, it would appear that, for some meaningful predictors, the cut-off score which yields maximum tetrachoric *r* is less than 33% marks, which is the minimum required to pass the middle school examination. Therefore, it is felt that in such cases 33% marks be taken as the required cut-off score. Table 6 shows the cut-off scores for meaningful predictors for the different streams.

TABLE 6

Cut-off Scores for Meaningful Prediction

Subject	*Humanities*	*Science*	*Commerce*
English	66	67	66
Hindi	60		
Mathematics		50	50
Social Studies	63		50
General Science		52	
Aggregate	396	472	363

Achievement Profiles

If the school maintains achievement profiles, then the following profiles made on tracing paper can be superimposed on a student's profile. If the height of column in the meaningful subjects for a stream is lower than the key profile, the student may not be considered suitable for that particular stream. The key profiles for the three streams are shown in the diagram on the following page.

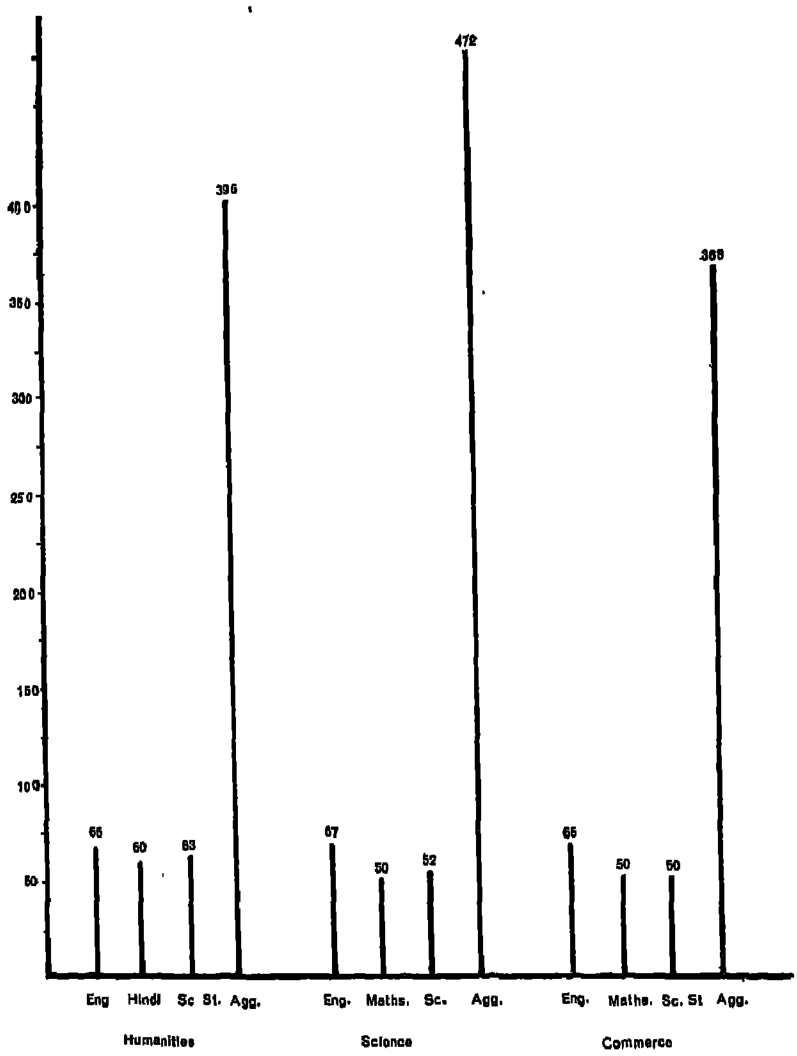

Fig. 1. Achievement Profiles in Raw Scores

From the profiles it is obvious that even when the same subject has been found meaningful for more than one stream, the minimum cut-off score for it differs from one stream to another. For example, the aggregate marks for success are in decreasing magnitude, respectively, for Science, Humanities and Commerce. The patterns of predictors for the three streams are different.

Conclusion

It has been observed that the curriculum and the examination at Class VIII level are not predictive of success at the higher secondary level atleast in Commerce and Humanities. They are to some extent predictors of success for Science, but not very efficient ones.

For the curriculum to be more useful for preparing students for higher secondary education and to be predictive of success at the higher secondary stage, it must be broadened at the delta level. Till such time as this is done, the use of psychological tests appears necessary for selecting/allocating students for different streams of higher secondary education, so that all who are admitted to a stream fully utilize the educational resources, thus minimizing wastage. The students will also be saved from frustration resulting from failure due to the selection of courses not suited to their age, aptitude and achievement.

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BOOK REVIEWS

The Nature and Manipulation of Achievement Motivation[1]

The Achievement Motive

Edited by David C. McClelland and others. Van Nostrand, Princeton, 1963.

A Theory of Achievement Motivation

Edited by J.W. Atkinson and N.T. Feather. John Wiley, New York, 1966.

The Achieving Society

David C. McClelland Van Nostrand, Princeton, 1961.

Dreams and Deeds: Achievement Motivation in Nigeria

Robert A. LeVine. University of Chicago Press, Chicago, 1966.

The Achievement Motive in High School Boys

Prayag Mehta. National Council of Educational Research & Training, New Delhi, 1969.

Motivating Economic Achievement

David C. McClelland and David C. Winter. The Free Press, New York, 1969.

In recent years much attention has been devoted by psychologists to the study of motivation, as may be clear from the number of publications in scientific journals and the number of books published on this particular topic. There are distinctly three sets of interests reflected in the various publications on motivation. Experimental psychologists, particularly those interested in animal behaviour, have studied motivation to help explain animal behaviour better, and to systematize the growing knowledge in this field. The other two groups of psychologists have common interests in human motivation. One group of social psychologists are more interested in laboratory experiments and the study of motivation as a problem of behaviour in a controlled, small group situation, while other group of social psychologists has been attracted to the study of motivation in the larger society. Both these groups are interested particularly in the area of achievement motivation.

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[1] The present review incorporates edited portions from reviews prepared by V. Kothandapani, Sue T. Crawford and Hans E. Krusa as requirement for Psychology Course 382 taught by Udai Pareek at the University of North Carolina at Chapel Hill in 1967.

Achievement motivation has attracted more attention recently than any other aspect of human motivation. As will be clear from the various publications in the scientific journals and the books being reviewed here, achievement motivation has attracted attention both of experimental social psychologists, who are studying motivation in the laboratory, as well as of psychologists who are interested in social change and in influencing motivation. The review of the various recent works is meant to show the trend in the study of achievement motivation in general.

The Beginnings of Achievement Motivation Studies

A group of social psychologists under the leadership of David C. McClelland started work on achievement motivation in the post-war period in the forties. McClelland and his associates developed a method of measuring motivation through the analysis of fantasy material generated by an individual in the form of the stories he or she wrote in response to some pictures selected from the TAT set. The method of scoring the content of achievement motivation in the stories was developed on the basis of arousing achievement motive experimentally and seeing the difference between the stories written by the subjects in the aroused condition and those in the controlled group. After several stories were analysed, a theory for motivation was developed, based on the use of projected fantasy material as reflecting needs or motives or motivation of an individual. *The Achievement Motive* gives the earlier material in this area. The book contains a long chapter called the 'coersive theory of motivation'. This chapter is significant as it summarizes and reviews theories of motivation, and then describes the theory on which the various experiments in achievement motivation area were conducted. The affective arousal theory is described in detail and then the various motivations are defined, based on this particular theory. Motive is defined as the learned result of pairing cues with affect or the conditions which produce affect. This theory has been used for the various studies described in the book. The book describes studies in arousing achievement motivation and obtaining stories under success and failure conditions. One chapter is devoted to the scheme of analysis of the stories to get at the achievement motivation content. The details of the various categories and subcategories in the scoring system are described with the relevant psychological explanations. This method has now become a standard scoring method for the TAT type of stories written by individuals.

The book also contains studies on the general applicability of the scoring system for achievement motivation and studies on the reliability of the scoring system. Studies on the relationship of achievement motivation and the level of aspiration and other aspects of behaviour are described. The final chapter reviews the studies throwing light on the origins of achievement motivation, the findings suggesting that the origins of achievement motivation are in the childhood period, and that the independence training given by parents through the various methods of child rearing contribute to the development of achievement motivation in the subjects. Three appendices give the illustrated stories from the records of subjects studied, scoring of illustrated stories and description of the eight pictures and two forms of verbal cues used in the various studies.

The book represents the earlier attempts at developing the concept of achievement motivation and the scoring system. Since the publication of the book, work in the field of achievement motivation has advanced a great deal. But this book stands as a landmark in the development of the theory of achievement motivation.

A Theory of Achievement Motivation

What is Achievement Motivation? The theory of achievement motivation is a miniature system applied to a specific context, the domain of achievement-oriented activities which is characterized by the fact that the individual is responsible for the outcome (success or failure), he anticipates unambiguous knowledge of results and there is some degree of uncertainty or risk. The theoretical model of achievement orientation presented in Chapter 2 of Atkinson and Feather: *A Theory of Achievement Motivation* is similar in general conceptual approach to the resultant valence theory of level of aspiration proposed by Lewin. Also in the assumption of an inverse relationship between the incentive value of success at a particular activity and the strength of an individual's expectancy of success (as subjective probability of success) at the activity. Yet the model presented by Atkinson differs from traditional model of level of aspiration in the precision of its assumptions, and its emphasis on the role of both relatively general and stable individual differences in personality (motives), and more specific and transient environmental factors (expectations and incentive values) that determine achievement oriented activities. In this latter respect the theory of achievement motivation, which focuses on the interaction of personality and immediate environment—Lewin's famous programmatic equation: B=f(P.E)—also differs from several other contemporary conceptions of motivation in which the determinative role of an individual's expectations of the consequences of his actions is of paramount importance.

In the treatment given to the nature of the interaction between stable motives that characterize the personality and immediate situational influences, the theory of achievement motivation represents a step toward conceptual integration of the two disciplines of scientific psychology—one concerned with assessment of individual differences and the other with basic behavioural processes.

Apart from seeking to identify the central thread of work contributing to the evolution of the theory of achievement motivation by bringing together the reports of research, the authors present several explicit applications of the theory to social problems and to place these close to the experimental studies to accentuate the theoretical justification for making the jump from laboratory experiment to the analogous problems in society.

One of the more novel implications of a consistently applied expectancy×value theory of motivation is the notion that the anticipation of a negative consequence should always produce negative motivation, that is, a tendency to inhibit activity that is expected to produce the negative consequence. This concept was missed in the earlier statement of Atkinson. The conventional notion that anxiety about failure should instigate achievement oriented actions literally blocked appreciation of the new idea generated by the inherent logic of the theory. The first four chapters serve to introduce the theory and relate it to similar theoretical formulations that have risen in such different domains as Edward's decision making Rotter's clinical psychology and social behaviour, Lewin's theory of level of aspirations and Tolman's maze performance of animals.

n *Achievement, Performance, Persistence, and Aspiration.* Some major hypotheses of the theory are examined in studies of the effects of individual differences in *n* Achievement and anxiety on aspiration, performance and persistence in achievement oriented activity. Litwin has investigated the influence of achievement-related motivation on gambling preferences more thoroughly. Litwin develops several different measures of preference for intermediate degree of risk and, in addition, presents evidence concerning a basic assumption of the theory that incentive value of success is a linear inverse function of the subjective probability of success. Persistence can be conceptualized as an interaction of personality dispositions and situational influences. Achievement oriented subjects selected tasks of intermediate difficulty significantly more often than did failure-oriented *Ss*. Achievement oriented *Ss* gave higher probability estimates that did failure oriented *Ss* but not in games where objective cues were present. Estimates of the amount of money that should be awarded as a prize for hitting the target in a Ring Toss Game were interpreted as estimates of valence and shown to be a product of motive and incentive value.

Feather demonstrates differences in the degree to which persons highly motivated to achieve and those anxious about failure persist at an insoluble achievement task in the face of continual failure, as a function of whether they initially believed the task to be easy or difficult.

Moulton presents solid evidence confirming implications of the theory concerning what are traditionally called typical and atypical shifts in aspiration following success and failure. Atkinson's risk taking model predicts that individuals high in fear of failure and low in quency distribution of goal setting behaviours. However, intermediate goal-setting, as measured by confidence statements, does not coincide with the theoretically expected value of ·5. The finding that *n* Ach positively relates to subjective probability of success supports the previous research of Pottharst.

Smith presents evidence concerning two assumptions underlying past research on *n* Achievement: first that achievement imagery in thematic apperception reflects only achievement motivation; second, performance scores of *Ss* high and low in *n* Achievement can be compared on the assumption that the two groups are similar on the average, in all important respects other than achievement motivation. The pattern of results across conditions clearly indicate that as the proportion of overall motivation for performance attributable to achievement incentives increases, the strength of the positive relationship between *n* Achievement and performance increases. The need for standardized conditions for obtaining optimally valid *n* Achievement scores is emphasized. Also called into question is the assumption made in some studies of motivation and performance that extrinsic motives will be uncorrelated with *n* Achievement.

Some Neglected Problems. Bringing to light the neglected factors in studies of achievement-oriented performance, Atkinson and Patricia O'Conner stress the importance of two problems that have been neglected in earlier research on achievement motivation and performance: (a) apparently the incentive value of immediate social approval (the goal of the affiliative motive) is positively related to the difficulty of a task in much the same manner that incentive value of success (the goal of the achievement motive) is related to task difficulty; (b) the summative effects of achievement-related motivation and *n* Affiliation can produce decrements in the achievement-oriented performance of *Ss* who are high in TAT *n* Achievement and low in Test Anxiety.

A Neat Formula. Atkinson in his appraisal of the theory brings out the formula of the resultant achievement-oriented tendency. Achievement-oriented activities are influenced by the resultant of the conflict between the tendency to approach success (T_S) and the tendency to avoid failure (T_{-f}) by remembering that the sign of the tendency to avoid failure is negative, we may designate the resultant-oriented tendency as $T_S + T_{-f}$. The resultant achievement-oriented tendency

$(T_S + T_{-f})$ is positive when $M_S > M_{AF}$ and negative when $M_{AF} > M_S$.

As Edwards pointed out, the whole theory may be simplified algebraically:

$$T_S + T_{-f} = (M_S \times P_S \times I_S) + (M_{AF} \times P_f \times I_f)$$

where T_S is Tendency to approach a task
T_{-f} is Tendency to avoid failure
M_S is Motive to achieve success
M_{AF} is Motive to avoid failure
P_S is Expectancy or probability of success
P_F is Expectancy or probability of failure
I_S is Incentive value of success (same as valence of Lewin, Utility of Edwards)
I_f is Incentive value of failure

We can simplify the above equation:

$$T_S + T_{-f} = (M_S \times P_S \times I_S) + (M_{AF} \times P_f \times I_f) \quad \text{......(1)}$$

But $I_S = I - P_S$ and $P_f = 1 - P_S$; $I_f = -P_S$ and making these substitutions in Equation 1 we have:

$$\begin{aligned} T_S + T_{-f} &= [M_S \times P_S \times (1 - P_S)] \\ &\quad + M_{AF} \times (1 - P_S) \times -P_S] \\ &= \{M_S \times [P_S \times (1 - P_S)]\} \\ &\quad - \{M_{AF} \times [(1 - P_S) \times P_S]\} \\ &= (M_S - M_{AF}) \times [P_S \times (1 - P_S)] \end{aligned}$$

The simplification reminds one of Lewin's equation:

$$B = f(P, E)$$

When the resultant achievement-oriented tendency $(T_S + T_{-F})$ is negative, there will be no active impulse to undertake a particular achievement-oriented activity (T_A) unless some positive extrinsic tendency to perform the activity (Text) overcomes the resistance of $T_S - T_{-F}$: that is,

$$T_A = T_S + T_{-f} + \text{Text}$$

Adding of these components is consistent with the logic of contemporary decision theory.

A Final Word. The papers selected for presentation in this book bring special insight to a new theory of achievement motivation. Each of these studies is open ended and tells us the conceptual scheme is not yet a settled creed. Apart from elaborating on the general appraisal of the contemporary theory of achievement motivation, the authors identify the implications of this book for a theory of motivation and emphasize some new directions for future research. The final chapter summarizes the theory up to date and gives an excellent description of two types of personalities, namely the Achievement-Oriented Personality and the Failure-Oriented Personality. These descriptions are so vivid and picturesque but at the same time based on scientific research that any condensation will be doing a great injustice to the authors. The passages should be read in original to derive full satisfaction.

Economic Development: n *Achievement* vs *Other-directerness.* David McClelland states the purpose of his book, *The Achieving Society,* most concisely in his introduction: "What it does try to do is to isolate certain psychological factors and to demonstrate rigorously by quantitative scientific methods that these factors are *generally* important in economic development." Although he believes modern psychology can contribute to the understanding of economic development, he cautions that modern quantitative psychology is young, that the scientific study of motives and values is younger still, and that his book is a first attempt by a psychologist primarily interested in human motivation to interpret the problem of economic development. Despite these cautions, his book is invaluable. He has analysed many disparate economic, historical, social and psychological factors surrounding development and, in doing so, has tried to pull the threads together into an integrated whole. Most 'important, however, are his efforts to empirically validate his and others' hypotheses about economic development. These efforts set him apart from most other students of economic development who have done little more than present 'logical' or 'reasonable' theories to account for a particular country's economic rise and fall at a particular time.

I feel I must apologise for my own errors of misunderstanding or oversimplification of McClelland's work. These errors seem unavoidable when one tries to present the essence of a work so extensive as his. To lower my margin of error somewhat, I have decided to review his principal argument hat a high need for achievement (*n*

Achievement) is a requirement for economic advancement by tracing the sources of the achievement motivation through the personality characteristics of the entrepreneurs, who promote economic development by organizing business units and by increasing their productive capacity. Next I will look at McClelland's prescriptions for promoting economic development by increasing the *n* Achievement level within a particular country. I will then take up his seemingly unrelated argument that the value attitude of other-directedness must also be increased for economic development to occur and his suggestions for increasing it.

One of McClelland's basic arguments is with the Social Darwinists, including Marx and Freud, who see man as a creature entirely shaped and limited by his environment, including the value attitudes of his society. He tries to show that through his need to achieve, i.e., the achievement motivation, man himself can shape and influence his society and its attitudes. He says:

> If our study of the role of achievement motivation in society does nothing else, perhaps it will serve to redress the balance a little, to see man as a *creator* of his environment, as well as a creature of it. Much of what the Social Darwinists have taught must be thought through again in terms of a new dimension—i.e., the motives of men affected by an environmental change or a social institution....History must be written again, as it was in the 19th Century, at least partly in terms of national character, in terms of what a people is trying to do or is most concerned with.

However, McClelland runs into difficulties with his argument when he discovers that it is the environment, expressing itself through the value attitude of other-directedness, which is as crucial a determinant of economic development as is the achievement motivation.

In the ninth chapter McClelland tries to uncover the intrinsic determinants of the achievement motivation. He notes that the child-rearing practices prevalent in a society produce empirical differences in the *n* Achievement level of children by the age of five. He cites Winterbottom's study which sought to determine at what ages mothers expected their sons to be relatively independent and able to care for themselves. Her findings showed that mothers of sons with high *n* Achievement tend to expect self-reliance at earlier ages and that these mothers also place fewer restrictions than the mothers of sons having low *n* Achievement. Further studies showed that high *n* Achievement results from early mastery training as long as the training is not a result of authoritarianism or rejection by the parents. McClelland then discusses the influences of parent-child interaction on *n* Achievement levels. On the basis of an experiment, in which both parents were to coach their sons who were engaged in a block-building game blindfolded, he concludes that the parents of children having high *n* Achievement set higher standards of excellence and tended to exhibit more emotional support toward and involvement in their sons' performances than did the parents of the boys with low *n* Achievement. Moreover, there were differences in the effects of the mothers' and fathers' performances. The mothers of the boys with high *n* Achievement were a more dominating influence than the fathers. Thus, McClelland concludes, dominating behaviour promotes the development of high *n* Achievement if it comes from the mother, but it will have the opposite effect if it comes from the father. McClelland summarizes the findings best by saying that 'moderate child-rearing pressures on several dimensions are optimal for producing *n* Achievement."

McClelland next examines extrinsic factors which modify the society's child-rearing practices. He first looks at parental values which are reflected in their religious world views. He notes the crude difference between Catholic and Protestant parents—Protestant parents generally are less authoritarian and they encourage discovery and individuality more in their children than Catholic parents do—but he attributes these differences to the social setting, that is, how much these groups have been assimilated into an achievement-oriented culture. The religious values which McClelland does find positively linked with the child-rearing practices of parents having sons with high *n* Achievement are those which he calls "positive mysticism." Essentially these values represent a reaction against traditional church authority and a reverence for the divine in favour of individual communication with God and a mystical reverence for life. It is at this point, however, that McClelland runs into a fundamental problem which he is never able to resolve: which influence precedes which—individualistic religion or *n* Achievement? He concludes that either factor could precede the other, but that religious views seem most likely to come first since religion "is one of the more stable persistent elements in many societies."

In Chapter Six McClelland describes the characteristics of the entrepreneurs, the major sources of high *n* Achievement in a society. His findings are based upon experiments involving young boys in risk-taking games of skill and chance and upon direct measurement of their attitudes expressed in structured questionaires. He finds that subjects with high *n* Achievement are willing to take moderate risks in which the outcome depends upon their skills rather than chance, that they perform energetically and innovatingly only in situations having a moderate challenge, that these individuals feel it is more important to initiate successful actions than to have responsibility only to themselves, and that these people value money extrinsically as a means on concrete feedback of their success.

In the final chapter of his book McClelland prescribes some ways in which the *n* Achievement levels might be increased, enabling a society to develop more rapidly. The principal ways are to decrease father dominance, to make ideological conversions, to change educational policies, and to reorganize adult fantasy life. Two possible means of decreasing father dominance are by his participation in wars or in occupations, such as sea-faring, which take him away from home. Neither of these possibilities is very realistic, he concludes. However, ideological conversions, whether they represent change from one religion to another (e.g., from Catholicism to Protestantism) or change by protest groups within religions can and do produce higher *n* Achievement levels as long as their reform zeal persists. Educational changes may help, but they must occur in the crucial period for acquiring *n* Achievement, between the ages of 5 and 10, and they must be supported by ideological conversions. Finally, a person's *n* Achievement may be increased by programmes which rework his fantasies as fantasies are not bound to specific situational cues as is overt behaviour.

The most serious problem in McClelland's work is his discovery that the presence of other-directedness, a value attitude imposed by society, is as important to economic development as high *n* Ahievement. In Chapter Five he tries to determine which value attitudes prevalent in society are important in advancing economic development. He tests nine attitudes commonly associated with economic development by looking for corresponding elements in children's stories from a variety of countries developing more or less rapidly after 1925 and

In the Hausa group a man was promoted to higher rank by being a loyal and obedient follower. The emir or ruler of a group insisted upon execution of his orders and rewarded those who obeyed. (And punished severely those who disobeyed). Rewards of patronage went to the most loyal and obedient followers. There was no room for a man with independent ambitions of his own. The Hausa today occupy the northern half of the country and constitute a majority of the total population of Nigeria.

The Ibo reside primarily in the south-eastern portion of Nigeria and have the greatest density of population in the country. They are a highly individualistic people. They have no emirs. They enjoy an open society in which any freeman can attain high status. A premium is placed on occupational skill, enterprise, and initiative. Whereas the Hausa status system was politically oriented, the Ibo system was occupationally oriented. Rewards went to those who worked hard and earned it.

The third major tribe in Nigeria are the Yoruba who occupy the south-western part of the country. In a sense the Yoruba society encompassed elements of both the Hausa and Ibo without the extremes of either. The Yoruba were ruled by obas or chiefs who did not have the control over the society that the Hausa emirs had. Many craft occupations existed that presented an opportunity to excel, and trading offered good opportunities to amass wealth. Hereditary restrictions governing status mobility were, however, much greater than among the Ibo. The net result was that status mobility for the Yoruba was intermediate between the Ibo and the Hausa.

With this background on the peoples of Nigeria we can proceed with the basic hypothesis presented in the book. It is briefly this: status mobility can affect child rearing practices which in turn provide a base for *n* Achievement motivation which in turn is relevant to economic development.

The fundamental research in the book involves two methods of testing for *n* Achievement with Nigerian schoolboys as the subjects.

One method is based on testing through the use of written dream reports, the other uses essays which the schoolboys were asked to write. In both methods a new scoring system, based on the McClelland-Atkinson scheme for scoring a story, was devised.

The usual means of testing for *n* Achievement is by an analysis of stories told in reaction to a series of pictures from the TAT. The pictures would, however, present a problem when used in comparative cross-cultural study because the subjects are presented in the clothing, housing, and concepts of a Western culture. In the study three different Nigerian cultures are involved, with none of them based on Western thought or customs. The Hausa, Ibo, and Yoruba differ greatly in clothing styles for example, and each society is even somewhat prejudiced against the dress of their neighbours.

With the use of pictures ruled out as a satisfactory method of obtaining stories which could be scored, LeVine turns to dreams and essays, both of which are written by the schoolboy representatives of the three ethnic groups of Nigerians under study.

If the author's hypothesis is correct, differences in the incidence of *n* Achievement should correspond to the differences in the traditional status mobility among the three groups under study. Specifically, the Ibo youths should score the highest, the Yoruba next, and the Hausa should score the lowest in *n* Achievement. As the author states, "On the assumption of psychocultural lag—that is, a lapse of several generations between the onset of alterations in the status mobility system and consequent alterations in the frequencies of personality characteristics—and in the knowledge that social change for the Nigerian masses has been gradual rather than sharply discontinuous we decided to use youths drawn from the three ethnic groups as the subjects of the study. Since the interior of Nigeria came under British control between 1890 and 1920, a young person in 1961-62 would almost certainly have four grandparents who were raised under traditional conditions—people from Lagos (a British colony since 1861) being the only exceptions—and many would have parents who were adults before the Western impact was felt. According to our theory, such individuals should manifest personality characteristics not substantially different from those of their forefathers."

The schoolboys that were chosen came from male secondary schools located in each of the three areas, and were representative of the three ethnic groups. In each of the schools instruction was carried out in the English language, thereby making it possible for the students to write their dreams and essays in English, and thereby providing a common base for scoring.

Altogether 342 male secondary school students were tested and their responses analyzed. They ranged in age from fifteen through twenty-eight, with a mean age of nineteen. While the upper limit of these ages may appear high by our Western standards, the difficulties of gaining an education in Nigeria quite naturally raise the age level at which students attend school.

The dreams were collected from the students in the classrooms. The student was given two sheets of paper and asked to spend half an hour writing in English a description of the most recent night-time dream he had had, and the next half hour writing a description of a dream he remembered having had more than once.

Some of the reports indicate that the distinction between night dreaming and day dreaming was not always clear, but from the standpoint of the imagery or fantasy involved perhaps this is not too important. The student reports were then typed, all traces of ethnic identification (such as names) were removed, and they were turned over to the scorers. The scoring was thus "blind".

In the essay part of the testing, the same schoolboys were asked to write essays on success. One essay was in response to the question "What is a successful man?", another essay followed immediately on "How does a boy become a successful man?". For each essay the boys were given half an hour. Again their responses were typed and masked to avoid identification by the scorers. The scorers scored for values involving achievement and obedience—social—compliance, in accordance with a carefully designed content analysis scheme.

After scoring both the dreams and the essays for *n* Achievement motives, were there group differences in achievement responses among the Ibo, Yoruba, and Hausa consistent with those predicted by the status mobility hypothesis? The answer is yes for the dream reports, but no for the essays.

The author has a logical explanation for these findings and we quote him.

> Our explanation of this is that persons high in *n* Achievement are so preoccupied with it that they supply achievement themes and images to completely blank and ambiguous stimuli, like a request for recall of dreams or an open-ended question about the future; persons low on *n* Achievement are more likely to think of things unrelated to achievement when the stimulus is ambiguous, since

> they have no internal pressures operating to make them provide achievement themes. But when the stimulus itself provides external pressure in the direction of achievement response— by use of terms like 'success'—then individuals low in *n* Achievement respond just as vigorously with the language of achievement, thus obliterating differences due to motivational level and substituting verbal differences of another order. Thus the value data on achievement in the previous chapter not only fused mention of hard work with mention of striving for excellence but also, by focusing the subject's attention on the notion of a 'successful man', suppressed the difference between the individual who responds to internal cues concerning achievement and the one who responds only to external cues such as this task gave him. When the external achievement cues are not present, as in the dream reports and the public opinion survey, the predicted and more interpretable response pattern asserts itself.

In addition to the author's comments we might add one based on personal experiences obtained by working with similar Nigerian students. We found them most anxious to please. We also found them quite ready to repeat, sometimes verbatim, admonitions given to them by people in authority. Consequently if they wanted to please an English instructor they would readily repeat words and ideas that had been given to them by the same or another English instructor. This did not necessarily mean that they really believed or even understood what they were saying, rather it was their interpretation of the 'proper' thing to do. Accordingly when asked to write about success in English and for a European, one might expect that they would readily repeat all the truisms about success that they had obtained from this Western oriented teacher, without any regard for their own cultural differences.

The most significant empirical finding in this study by LeVine is that the frequency of achievement imagery in dream reports was greatest for the Ibo, and least for the Hausa. The Yoruba scored between these two. This finding agrees completely with the hypothesized prediction and is in accordance with the traditional status mobility systems of the various group cultures. As for the validity of this finding we can find no basis for criticism. From all reports the study was conducted with a high degree of thoroughness and with the greatest attention to the scientific method. The author points out that since the study did not include data on parental values and child-rearing practices as such, we can only assume that the basic contention by

McClelland regarding the importance of the mothers in implanting higher achievement motives is correct.

Again, and from our observations of the three ethnic groups over a two-year period while we lived in Nigeria, we can only agree that the Ibos are the most industrious, and in general possess the qualities of the Western style entrepreneur to a considerably greater extent than do the Hausa. We also found them to be more imaginative and resourceful when faced with a business problem. As might be expected, they were also more independent in their actions and less willing to 'follow the leader'.

Aside from the validity of the findings, what about their usefulness? What implications do they have for the future development of Nigeria? We arrived in Nigeria in 1962 just in time to join in the celebrations for the second anniversary of the founding of the republic. There was great talk of nationalism—of one Nigeria for all Nigerians—regardless of tribal differences. We entered with enthusiasm on the task of building one university in Lagos, the federal capital, that would serve all Nigerians. We opened the university with students from the Eastern region (Ibos), the Western region (Yorubas) and a few from the North (Hausas). The obvious reason for the fewer students from the North was that there were fewer applicants who could qualify on the basis of their education. Parenthetically, we might add however, that the single students receiving the top scholastic honours at the end of both the first and second years was, a Northerner. Our task, and one of the objectives of starting the new university in Lagos was to bring these diverse cultures together as students so that in the future as political and business leaders they would work together for a united Nigeria.

In some ways we are content that we did not have a book, such as the one under discussion, available to us at the time we started the University of Lagos. It might have encouraged us to give more attention to the Ibos. As it was, we worked hard to be impartial, and kept all discussion of tribal differences out of the university setting. At the end of two years we thought we were making progress, the boys seemed to accept their classmates and were developing a mutual respect for each other.

While we were apparently making some progress in developing tolerance with a handful of college students, however, a group of young Ibo military officers were getting increasingly restless at being dominated by the North. And a group of old guard politicians in the North were making loud noises about the number of Ibos who held government positions in the North. And a member of the Yorubas in the West, including one of our new faculty members, were stirring up old hatreds and pouring salt in wounds that were not quite healed. The result is history.

Today the Ibos have been driven out of the North and the West after a massacre that killed thousands. The Yorubas have mostly gone along with the North although some are still trying to play the intermediate game. The Ibos in the East have in effect seceded from the rest of the country, and the federal government, now largely Hausa and Yoruba, are trying to quell the East by force. The future of Nigeria looks very sad indeed.

Using the word motivation in its broader sense, how can the various groups be motivated to forget their individual differences and to work together to build a country where all can prosper?

How can we make the best use of the strong achievement motivation of the Ibos along with the loyal conservatism of the Hausas? We can only hope that future psychological studies will give us a greater insight into the development of those personality factors that will lead to the greatest good for the greatest number.

Achievement Motivation of Indian Boys

Mostly, achievement motivation researches have been done on adults. *Achievement Motive in High School Boys* is the first serious and thorough study done on students in any part of the world.

The book reports two studies, one on the achievement motive in high school boys, and the second on an experiment in motivation training. The first study was conducted in February-March 1965 in Delhi. A survey was done in 32 higher secondary schools of Delhi for ninth-class boys with a total number of 975 pupils. The study was done with a projective technique developed for this purpose on the lines of TAT. The test was found to be reliable (reliability co-efficients ranged from .39 to .73). The author developed another paper-and-pencil test, Achievement Motivation Inventory (AMI) with reliability coefficient of .67. The results reported in the book show that the level of achievement motivation in Delhi school boys compare well with those reported from Germany and USA, although it is lower than those reported in Brazil and Japan. No rural-urban differences were found, nor any differences were found according to socio-economic status. However, boys of fathers with high education showed the highest level of achievement motivation, as also boys from the semi-professional groups. With education controlled, the working class boys showed a higher level of achievement motivation than those from the lower middle class, white colour working group. Achievement motivation showed positive correlation with the total performance at the school annual examination. Motivation to avoid failure showed negative correlation with achievement motivation and self-expected vocational success.

The second study was conducted in Jaipur, Rajasthan, during 1965 and 1966. It involved five experimental and two control schools. Boys in one experimental school were given a brief course in achievement motivation by their teachers who had been trained for this. Boys in two experimental schools were given achievement boosting training programme, and boys in two other experimental schools were given both types of training. Results showed that boys who received both kinds of training showed greater change in their achievement motivation, and that achievement boosting programme alone did not produce necessary change in them. Those boys whose fathers were in the low socio-economic status showed greater change in achievement motivation. However, the effect of social class was not significant. The various instruments developed for this purpose are given in the appendix.

The book makes a significant contribution in reporting results of researches from Indian high school boys, and is an example of a thoroughly conducted research.

Developing Achievement Motivation

Motivating Economic Achievement is a departure from traditional psychological researches in many ways. Psychologists have been mainly concerned with the study of the nature of motivation, and psychological and social correlates of motivation. Some attempts have been made by experimental social psychologists to manipulate the seveial variables in order to see how changes in a small group occur. McClelland, however, has taken a bold step in doing research in an open community, with all the obviously known limitations. The authors of the book deserve compliments for this courage.

The book reports research done in Kakinada, a medium-sized town in Andhra Pradesh. Data from another town, Vellore in Tamil Nadu, have also been included in the report. The research was undertaken during 1964 and 1967. Based on McClelland's theoiy of achievement motivation, it was hypothesized that the presence of a small and strong group of persons with high achievement motivation in a community would generate changes in the entire community. The study was based on two-level hypotheses: firstly, that achievement motivation can be developed in groups of adults, and secondly, that a nucleus of a group of people with high need for achievement in a community would disseminate achievement motivation and produce necessary changes resulting in economic development of the community. The research on these two hypotheses is rather ambitious; the authors have been able to prove the first hypothesis. As far as the second hypothesis is concerned, the present study does not give enough evidence to prove or disprove it. The authors contend that the second hypothesis has also been partly proved.

The study reports the results of an experiment in achievement motivation training in which 78 business men from Kakinada and Vellore were involved. They underwent an intensive psychological training for a period of ten days in groups of 10-14. These persons were studied in their own places of work. There were control groups, consisting of 22 individuals from Kakinada, not involved in training, and 35 from Rajahmundri (a controlled town) and 16 from Vellore. Age, mean years of education, occupation, median values of annual gross income, and personal capital were used for matching.

The training course was based on 12 basic inputs, clustered in four groups: achievement syndrome, self-study, goal setting, and interpersonal support. Chapter two of the book describes the rationale of the training and is a brilliant contribution to the technology of behaviour modification in natural groups.

Analysis of several measures of individual behaviour and economic effects demonstrated that the participants who underwent achievement motivation training showed significant improvement in many respects of entrepreneural performance, as revealed by the comparison of before and after data from these individuals, and comparison with three matched control groups. These persons showed more active business behaviour worked for longer hours, started new business ventures, made more specific investments in new, fixed, productive capitals, employed more workers and tended to have relatively larger percentage increases in the gross income of their firms. The authors show that as a result of the training, there was mobilization of approximately Rs. 3,760,000 of specific new capital investments and about 135 new jobs. The research showed that persons who were incharge of their business, those who were dissatisfied with their performance, but were interested in solving specific problems gained more from the training. According to the authors, the courses converted latent personal resources of the individuals' into productive economic activity. This was by strengthening the sense of efficacy amongst those who wanted it. The authors admit that achievement motivation alone was not sufficient to increase entrepreneural activity, and so the training had inputs from other sources also. According to the authors, achievement motivation courses did not increase or alter the ego ideal so much as they strengthened the ego, the adaptive mechanism by which the person achieves the goal.

The book describes in detail the setting of the experiment, chronological steps taken in preparing the training programme, the difficulties in running the experiment in a rigorous way, and the results of the research. The book gives four case studies of persons undergoing change. In appendix, the scoring manual for sense of efficacy is given.

The book departs from the usual style of reporting research findings. It gives a feeling of living conversation, and sharing of new experience with the readers. Wherever the authors thought that this communication can be facilitated by photographs, anecdotes, description of statistics, etc., they have used these freely. In this sense, the book innovates in research reporting.

Probably, the greatest contribution of the book is to go a step forward and demonstrate that motivation can be changed through appropriate methods. In this sense, the book has made a real contribution. However, there are several lacunae from the point of view of rigorous standards of research. Some of these were part of the research design, and some were caused by the constraints of the situation. This is for the first time that a training programme in achievement motivation was developed, and it was developed in India. A more thoroughly conducted research on the premises of this book may be needed in future.

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Educational Testing

Developments in Educational Testing, Vol. 1.

Karlheinz Ingenkamp (Ed). University of London Press, Ltd., London Ec. 4.

Though the problems confronting educationists in the area of educational testing in different parts of the world are similar, no consolidated information was, however, available till the publication of this book on how experts in different countries have attempted to approach and solve them. The pressing realization of this need led the Pedagogisches Zetrum in Berlin to organise the First International Conference on Educational Testing from 16 to 25 May 1967, at which 27 countries were represented.

The conference was attended by such people of eminence as Chauncey, Dunn, Ebel, French, Henrison Lindquist and others, that the list of its participants is easily a directory of experts from different parts of the world, who have made outstanding contributions in the field of testing. These scholars exchanged experience by contributing papers and holding discussions in the course of the conference.

Content Overview

In all, seventy-nine papers were sent in. Thirty-eight of these form the contents of the first volume which has been very ably edited by Karlheinz Ingenkamp. The papers have been classified into six divisions on the basis of the nature of their content. The bunch of papers of each division has been put in a separate section. The titles of the sections of the book are:

1. Testing Throughout the World.
2. Educational Objectives of Testing.
3. Varying Types of Tests for the Assessment of Scholastic Achievement.
4. Recent Types of Tests for the Assessment of Abilities.
5. Recent Tests for the Assessment of Social Behaviour,

Interests and Attitudes: The Results and Significance of Culture-Fair Tests.

6. Method of Test Construction and Test Analysis. Recent Developments in Machine Scoring and Processing.

As it is neither possible nor desirable to present a consolidated review of a compilation with such varied themes it appears appropriate to indicate the highlights of the six sections of the book to give an overview.

The first section of the book consists of twenty papers on the present and proposed testing programmes of almost the same number of countries by their respective representatives. Each paper has its own central theme and the scatter of the problem raised by them is very large. Though teacher-made tests are not completely ignored a discussion on standardized tests constitutes a major part of the papers. The papers outline the testing programmes in the respective countries and refer to the structure of education and administrative machinery as they describe the functions of tests, the principal kinds of tests, the extent of the use of standardized tests, the levels or grades at which tests are administered, etc. Several of these papers close with detailed information about tests and test publishers in the countries concerned.

The second section deals with Educational Objectives of Testing. The papers strike at one of the most important and fundamental prerequisites of testing, the objectives, and view them from different angles. While the already established taxonomies of educational objectives in the cognitive and affective domains are recapitulated, a new one in the psychomotor domain is proposed. The objectives of testing (expectations), of different categories of people from a testing programme are also discussed. A discussion of educational potentialities and dangers in the use of tests also forms a part of this section. A paper on the development of objectives, if included, could have filled in a gap that exists.

Papers of the third section concern themselves with various unconventional item-types for the testing of scholastic achievement and the construction of objective-based tests items and test batteries. The papers help to provide an insight into the problems of test construction for meeting the challenges of the new developments in the content of teaching and teaching methodology as they are related to the field of testing.

The fourth section deals with the measurement of creative thinking abilities which are often qualified as divergent, productive or inventive. Some recently developed batteries in this area form part of this section along with the context effects in the assessment of these abilities. A study to validate Thurstone's concept of 'closure' is also included in the section. This study, whose details can be referred to in the book, comes to the conclusion that though 'closure' does exist in the cognative domain, it cannot be confirmed to be the same function as the perceptual closure studied by Thurstone.

Section Five of the book consists of papers on the assessment of the various non-scholastic aspects of the growth of students' personality. They cover social behaviour, interests and attitude. Their potential for educational theory and practices, which form the subject matter of the papers, are likely to be of great use in view of the recent developments in these areas and the newly bestowed responsibilities on modern education.

Methods of test construction and test analysis form the subject matter of the sixth section. The papers of the section deal with the steps for devising a new test, machine scoring of tests, statistical analysis, and interpretation of the results.

Critical Estimate

The main merit of the book lies in the fact that it presents the latest views of the experts on various technical issues in the field of testing, and gives up-to-date information about the latest developments and the testing programmes prevalent in different countries of the world. Yet another treasured content of the book are the recent investigations in the field of testing. Several of the studies described in it can be replicated for the validation of results and will make available inferences regarding the degree of their application in other countries and cultures.

The book being a compilation of papers presented at a conference could not have been published better. But its value could have been greatly increased, if, as a part of planning the conference, a committee of experts had developed an expected list of discussions, in advance, to cover the various areas of testing in a comprehensive and a connected manner. Thus, several gaps that now exist could have been filled in by requesting the experts who might have worked in the respective fields, to contribute papers on them.

The title of the book raises some expectations which its contents fall short of satisfying. These are particularly related to its deficiency of details regarding the systems of school evaluation in vogue in different countries. Secondly, the book mainly concentrates on standardized tests. This seems to be an injustice to teacher-made tests, which are by no means less important. Thirdly, the latest information about the form and content of examinations conducted by the public examining agencies in various countries is another aspect that the reader eagarly looks for in the book without much success. It cannot be doubted that in future such conferences will be held and it is hoped that they will look after the aforesaid aspects.

Above all, the price of the book (£6. 10s.) easily takes it out of the reach of a large number of educators and workers in the field of testing who would have liked not only to read it but also own it. This is likely to put a serious limitation to the extent of its use. The publication of a cheaper edition of the book therefore seems to be a possibility worth exploring.

It may be said in the end that with the coming in of the second volume of this book, a comprehensive treatise in the field of educational testing would come into being and it is hoped that these two volumes would give a better understanding of the various kinds of activities going on in different countries and ultimately lead to a qualitative improvement in educational testing all over the world.

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Education for Employment and Development

Planning Occupational Education and Training for Development

Eugene Staley. Orient Longmans, New Delhi, 1970.

There is now a growing amount of literature on education as an 'investment'. Many economists have written on the place of education in economic development indicating that the contribution of education to economic growth is not insignificant. Some of these studies have attempted to quantify the contribution of education in certain countries. If education has so much bearing on national development, its 'products' would have to fit the priority needs of economic growth. This suggests that education should be geared to the requirements of the economy. At the same time, education is a consumer goods. There is an inherent 'cultural' and 'economic' conflict in educational thought, because there is generally a shortage of education and, therefore, the provision of any education is welcomed. But, as John Vaizey has put it, 'more' education of a sterile 'cultural' kind seems to be not only uneconomic but unwholesome. If this view is accepted, then education should be made more useful for carrying out various economic activities efficiently.

The fact that the present-day education, as imparted, is not sufficient for ocupational preparation in all cases has been widely recognized. As a result of this recognition, many countries have embarked upon specific programmes of education and training to shape the employable persons to the occupational requirements. Most of these programmes, however, are concentrated in the industrial field. Thus, the United Kingdom has introduced important innovations under its Industrial Training Act of 1964 which have influenced its education and training for industry. In the United States, a number of agencies are engaged in research as well as in encouraging research on the occupational suitability of education and the integration of 'academic' and 'vocational' aspects of education. In some Latin American countries, a special organization has been created with a view to promoting occupational training. All these measures are indicative of the growing concern that education should be made more purposive and useful to suit the modern fast-changing economy. How education can be made more useful from the point of view of the employment, is broadly the subject-matter of the present study.

The main objective of this study in the words of Paul H. Hanns, Director of the Stanford International Development Education Centre (SIDEC), who has written a foreword, is to throw light on a set of problems that is central to education's role in modernization and development. While Staley's study is concerned with Occupational Education and Training (OET), it is understood that studies on (a) Education and the Formation of Social and Civic Attitudes, and (b) Education and the Rural-Urban Transformation under the present series are also in preparation. The discussion in the book, which contains five chapters, proceeds in a systematic manner. The author starts from a broad conceptual framework and a general planning model of OET. Chapter Two gives an analysis of manpower needs. In Chapter Three, the content of education for occupational preparation is discussed. Then the question of institutional choices available to policy-makers is examined in Chapter Four. Finally, Chapter Five gives an idea of the organizational mechanism that may be necessary for planning coordination and financing of OET programmes.

At the outset, the author points out that the problems relating to OET can be studied in four phases, viz., general education; general plus preoccupational education; job-entry training plus further education; and career-long further training and retraining with further education. The discussion under each of these four phases of OET, though brief, tends to be interesting. The author goes on to analyse the manpower requirements of a developing country. He rightly emphasizes both quantitative and qualitative aspects of manpower requirements. In manpower planning, generally speaking, sufficient emphasis is not laid on the quality aspect and only a quantitative matching of demand and supply of a particular category of personnel is attempted. Even in respect of manpower estimates, there are still many differences of opinion on the techniques of making such estimates.

Further, the estimation of manpower requirements is fraught tain limitations, particularly in developing countries wher technical coefficients are not available due to paucity of rele tical series.

The author has emphasized the need for various types fied personnel in the context of an agricultural-rural transfo developing countries. However this aspect has not received attention from manpower planners as they have, by and larg themselves to the needs of the modern urban sector. Manp ning, if it has to be effective in developing countries where is predominant, has to concern itself with this problem on basis. At the same time, the author's assertion in regard ployment potential of the agricultural sector in developing may or may not be true. The author says that: "If, in developing countries) the employment problem is to be during the years immediately ahead, it will have to be met the agricultural and service sectors." (p. 25.) It is true th ture should be developed. But even with this developmer culture, there will still be surplus population on the land in loping countries such as India. It is, therefore, difficult t agriculture can solve the growing problem of unemploymen other hand, as economic development proceeds, the empl agriculture as a proportion to the total working force begins At least this has been the experience in countries like the Un the United Kingdom, Japan, etc.

At one stage in the discussion on a curriculum design the author says that "for a long time to come, people in n loping countries are unlikely to be in danger of having general education". But in a developing country like Indi ture is just the opposite, where general education is over important at all stages. Excessive general education, part the post-secondary stage, has at best shaped the Indian 'white collar' jobs only. The shortage of such job opport resulted into sizeable educated unemployment and caused tration and disappointment to the young employment seek

The main utility of this small book lies in the fact tha for the first time an attempt is made to offer a broad c framework under which various problems concerning OET can be discussed. This, however, is tentative as the author himself has pointed out. It is hoped that it will provoke further discussion on the subject which is of considerable importance to developing countries.

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Educational Progress
in
Rural Maharashtra

Progress of Education in Rural Maharashtra (Post-Independence Period)

A.R. Kamat, Gokhalė Institute of Politics and Economics,
Asia Publishing House, New Delhi, 1968.

The research publication under review gives the progress of education in rural Maharashtra during the post-Independence period. The basic data used in the study is derived mainly from two sources, namely, (i) the surveys and the resurveys conducted in 1955-63 in 69 villages, selected from 14 out of 25 rural districts of the state; and (ii) decennial population census reports of 1951 and 1961. The survey data collected in 1964 about primary schools in villages and about their development since 1947 has also been used. In other words, the study is spread over a period of a decade and a half, beginning in 1951. Although data used in the study for the villages were extracted from punched cards which were prepared for the original purpose of the surveys and resurveys of the villages, the principal merit of the data available in the surveys was that it made possible for author and his team to relate literacy patterns with several important aspects such as, for instance, size of land holdings, caste, occupations, etc.

The findings of the investigation are analysed in ten chapters. The book also has three appendices (one annexed to Chapter I), 19 detailed statistical Tables, and a five-page subject index at the end. A brief summary of the main chapters along with the major findings is given below.

Chapter 2 gives a detailed account of the historical development of primary education in Maharashtra from 1818 to 1964. However, the historical account given here relates only to the Western Maharashtra region (Desh and Kankan) of the present State. The study reveals that even before the British took over in 1818, there was a fairly well functioning system of indigenous schools which imparted religious education and elementary education in the 3 R's. But it is mentioned that school education was confined only to *boys*, and that scheduled caste boys ('untouchables') were not admitted to the schools. Immediately after the British Raj, now schools with a modern content of education were established. As a result the indigenous system collapsed by 1936-37. Only a few schools could survive from the indigenous stream. In terms of statistics, the number of modern schools rose from 322 in 1955-56 to 33,000 in 1954-55, and the number of children in these schools rose from 23,000 to 3.8 million during this period. The participation rate of girls in primary education rose from 16 per cent to about 30 per cent during this period. After the reorganisation of the States, the Vidarbha and Marathu regions were merged with the former Bombay State. By 1963-64, the enrolment in primary school stood at about 5 million.

Chapter 3 gives the progress of literacy during 1901-1951. It is interesting to find that the growth in the literacy rate of Bombay province moved from 7 per cent to 25 per cent during these 50 years against the slow growth of 5 per cent to 16 per cent for the country as a whole. Incidentally, the study is silent about the changes in the concept of literacy as used in different censuses but tiies hard to believe that village survey data is more reliable than the census because the surveys were conducted under the able guidance of the Institute. But one does not know the extent of the sampling error in the estimates because of the small size of the sample. We also note that the literacy rate during decade 1951-61 for the State as a whole increased from 21 per cent in 1951 to 30 per cent in 1961 as against 24 per cent for all India in the same year. The study reveals that the traditional relative positions of different caste groups in the rural areas still continue in respect of literacy and education. However, it is gratifying to note that a great change has come in recent years because of the very rapid growth of education. Now, Brahamins and advanced castes are not the only literate or educated communities in village society.

Chapter 5 gives the literacy pattern by occupation and size of holding. It reveals that literacy rates of different occupational groups were in the following order: Skilled services such as health and teach-

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Methodology for Foreign Language Teaching in India— The Case for Experiment

M. L. Tickoo

The author holds that very little of what has become accepted as part of contemporary methodology for foreign language teaching in India has the support of research and experiment based on actual situations of use. In the absence of scientific support, we now depend mainly on two sources for useful ideas and innovations: (i) individual 'success stories', (ii) the wartime experiments in the Western world. The author maintains that both, though very useful, have their limitations, and argues that what is needed in India is a method which should grow from research and experiment within the country and in the characteristic circumstances of an average school room or college lecture room. He then outlines the directions and conditions for such research.

Dissatisfaction with the results of language teaching in this country is growing fast and is being expressed on different platforms and through different media. The main targets of all the adverse criticism are the agreements that underlie the various methods which constitute our thinking and practice. The main purpose of this paper is to provoke a re-examination of our accepted ideas and practice and to make suggestions for the evolution of a scientifically-based approach.

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Three types of criticism deserve to be recognised for one reason or another. They come from three different agencies each of which is vitally concerned with the business of organised teaching. The first is the administrator on top, the second is the academician-adviser, and the third is the backroom researcher. Each is dissatisfied for reasons that are dissimilar from those of the other two.

Of the top administrator's dissatisfaction we can find no better example than the statements of the former Union Education Minister Dr. V.K.R.V. Rao. Dr. Rao not only found our methods ineffective but also drew attention to others which have produced much better and quicker learning.

The advisers' dissatisfaction has found its most recent expression in a report[1] which calls for rethinking on methods mainly because the ones in use cannot be put to practice in ordinary classrooms.

This researcher believes that our methods are bad not only because of an imperfect understanding of language but also because our theoreticians suffer from 'Pycroft's disease': they find it inconvenient to come down to the average teacher's level.[2]

These three types of criticism do not tell us all that can be said of our accepted methodology in foreign language teaching, but together they represent the viewpoints which reflect sympathetic understanding and scholarly concern for the evils of the system. They show that something has gone wrong and, up to a point, where it has gone wrong.

If we next ask: 'what are the main defects in our present day methodology', we will almost certainly have a large number of answers most of which may have the support of experience or informed opinion. Here we will concentrate, however, on one main defect which seems to call for immediate action.

The defect is this: language teaching methods all over the world lack support from scientific research. There have been very few attempts to evaluate methods in the actual situations of use. And of the experiments that have been made to do so, most have lacked scientific care and experimental control. The net result is that the methods in use today are based on opinion and individual preference rather than on scientific experiment.

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[1] The Report of the Second Study Group on English appointed in March 1969 by the Ministry of Education. (Mimeographed).

[2] See, for example, H.G. Widdowson, "The Teaching of English Through Science" in *Language in Education*, Oxford University Press, 1968.

Most research studies in this area have suffered from a combination of common defects which include:

(a) the failure to match the groups (control and experiment),
(b) the unchecked working of the 'Hawthorne Effect', and
(c) the enthusiasm and commitment of the 'experimental teacher' which go in favour of the sponsor's method.

If we exclude all such researches of doubtful validity, we are left with only a few which show a conscious effort to safeguard scientific objectivity and which minimise the influence of factors that favour either of the two methods being compared. This researcher has been able to study three of these experiments conducted during the last 25 years.

The first of these grew out of a controversy. Two great reformers in the field of Foreign Language Teaching in Asia made two opposite claims. One, Michael West, thought that reading was not only the easiest but also the most interesting aspect of a language and that it should therefore comprise the initial stage in foreign language acquisition. The other, H.E. Palmer, believed that since speech was the fundamental element in language, Foreign Language Teaching should follow the sequence that the child follows in acquiring its mother tongue. For Palmer, to teach reading before speech was like attempting to teach cycling before walking.

Both had their ardent supporters and both had pioneered many common reforms in the field. But who was right?

A two-year experiment in a private middle school in the Chinese province of Yunan was an attempt to find the answer.[3] The author of the experiment, D.F. Anderson, made sure of three things. He chose an ordinary school to test the two methods (*viz.*, the 'oral-ostensive approach' and the 'reading approach'); he did everything possible to match the variables in the experimental and the control classes, and he used the best materials and aids available for each approach. What gives his study additional significance is that it continued for two academic years and thus allowed time for each factor to make a relatively fuller impact.

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[3] See D.F. Anderson "Reading or Speaking First" in *Overseas Education,* January 1942, pp. 456-461, and April 1943, pp. 491-498.

What were the findings of this two-year experiment? Mainly two: First, each method produced better results in some linguistic areas and neither of them was suitable for all language skills. Second, the oral-ostensive method led to better attitudes to learning and gave confidence to even the poorer learners. The experiment vindicated Michael West's stand on 'specific practice' (i.e., that to teach a particular skill we must concentrate on the skill alone). It showed very little possibilities of 'transfer' from one language skill to another. But it also gave some support to Palmer's belief that initiation through speech has a few advantages not available to those who begin with reading.

The second experiment was conducted at about the same time as the first, but the place, the motives and the setting were different. This experiment took place immediately after the Second World War in a number of experimental classrooms in the United States. One of the main purposes was to find out how far and in what ways the oral-aural methods contributed to the acquisition of language.

Like Anderson's experiment, this one too failed to produce proof positive for or against the claims made for oral-aural method. It found that "in general....the experimental groups did not demonstrate so high a level of reading proficiency at the end of their first or second years as did the conventional students. In a number of cases the results were significantly poorer."[4] It gave no support to the thesis that oral-aural competence leads to reading competence: "As to the assumption made in some quarters that oral-aural competence automatically creates reading ability and that consequently the latter need not be specifically taught, there is evidence per contra so far as the experiments observed are concerned."[5] It found evidence to show that reading and aural-oral proficiencies constituted separate skills each of which called for direct and separate training. Its only additional significant finding provided confirmation for what had been found in Anderson's study—that most students are more highly motivated by the aural-oral rather than the grammar or reading approaches.

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[4] F.B. Agard, and H.B. Dunkel, *An Investigation of Second Language Teaching*, Boston: Ginn & Co., 1948, p. 290.
[5] *Ibid.*, p. 291.

The third experiment was conducted for two years at the University of Colorado beginning the fall of 1960.[6] The purpose of the experiment was to compare students who were taught audiolingually with those taught traditionally.

In this experiment use was made of tests which were validated and found reliable to a great extent. Despite several difficulties, mainly organisational, the experimenters also tried to control the variables and to match the control and the experimental groups.

The experiment showed the audiolingual students better in speaking, but poorer in writing and in German-to-English (L_2 to L_1) translation. The two groups were no different in listening, reading or English-to-German (L_1 to L_2) translation. In other words, although the experimental group was generally superior in some skills, the control group was superior in others.

The three experiments referred to above give us a few findings on language teaching methodology which have the support of good scientific research. What adds to their authenticity is the fact that each of them, although based on different assumptions and conducted under different circumstances from the others, has resulted in identical findings. Cumulatively they lend support to the following points:

1. Each language skill needs to be taught and learnt separately. The 'transfer of training' from one skill to another is, if anything, negligible.
2. The traditional methods are better able to help with some kinds of skills, the modern ones with some others.
3. Oral beginning has a definite advantage over the teaching of language through the eye.

Having said earlier that very little of what is accepted as successful foreign language teaching methodology has the support of authentic and accredited research, we have referred briefly to three research studies in support of this belief. A question naturally arises—what, in the absence of research, do we depend on for the sponsorship of new methods or for additions to old methods? Two main sources come to mind.

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[6] See G.A. Sherer, & M. Wertheimer, *A Psycholinguistic Experiment in Foreign Language Teaching*, McGraw Hill, 1964.

One, we depend on reports of individual 'success stories'. Successful teachers or teacher trainers make known their innovations; they tell us how they went about the business of foreign language teaching and, in many cases, detail the main procedures and practices which helped them produce proficient performers.

Nobody can doubt the usefulness of publications of this type for language teaching. Teachers need them to the same extent and for the same reasons as dentists or doctors require to study clinical case studies. And the more they discuss and understand such reports, the greater the chances of their being able to incorporate new thinking and practice into their teaching.

But although such individual success stories are of great value as auxiliaries to teaching, in particular to teaching done by inexperienced teachers, there is a danger too. Sometimes they also create beliefs which, on reflection, prove to be wrong. In the history of linguistic pedagogy one comes across many instances which caution against dependence on individual accounts of successful performance. This is so in part because successful performers fail to keep apart the man and the method and so begin to believe that their own methods hold the key to the mystery of language acquisition. Language teachers also mistake the success of the man for the success of the method and begin to see in it much more than is warranted by facts.

Individual success stories and the methods evolved from the experiences of individual teachers, especially if they promise too much too quickly, should be viewed with extreme caution.

Our second main source of ideas and techniques is better known. it, the war produced an unforeseen situation of the greatest magnitude during the Second World War. In the countries that were involved in it, the war produced an unforeseen situation of the greatest magnitude for leaders of linguistic pedagogy. The result was a large number of language teaching courses on both sides of the Atlantic.

There are several reports of these courses in the United States[7] and a few brief references to those run in the United Kingdom.[8] By all accounts they appear to have been able to achieve in days or weeks what is ordinarily attempted in months or years.

This wartime work has taught the linguist and the language teacher a great deal about both approach and method in foreign language teaching. In the United States it became the beginning of a new era in linguistic pedagogy and in the United Kingdom, in spite of the fact that the courses were much more limited in scope and sphere, it left many people convinced of the rightness of such highly specialized and fruitful work.

Some of the techniques used during the War have already been adopted or adapted for use in ordinary schoolrooms. With a better understanding of the organisation of these courses and a greater realisation of why and how they produced results which, in some cases exceeded the most optimistic of expectations, we may permit or even encourage a much greater infiltration of some more of the Wartime techniques into our ordinary teaching. But, as in the case of individual 'success stories' there are dangers and difficulties in any unstudied acceptance of the methods of these wartime programmes. It may result in too facile a faith in the miracles of courses which claim to produce native-like competence in foreign languages in three to six months. To avoid this, it is equally important to understand the special circumstances that led to the exceptional success of these courses. One may say a brief word on these here.

On the scale of time these courses were "short by the calender and long by the clock". (Firth, op. cit.) They were highly intensive courses and they provided full-time instruction in foreign language acquisition inside the classroom and outside. The contact hours per day were many times greater than in any peace-time courses. Also, being conducted under the 'whip of a whirlwind', they worked under pressures which created their own inimitable motives for teaching and learning. These too cannot be reproduced in our ordinary courses.

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[7] See for example, P.F. Angiollilo, *Armed Forces' Foreign Language Teaching*, S.F. Vanni, New York, 1947.

[8] See J.R. Firth, "War-time Experiences in Linguistic Training", *Modern Languages*, Vol. 2, 1945, pp. 38-46.

The unique success of these courses is attributable to some other factors also. They include: (i) carefully selected students, (ii) small classes with a near-ideal teacher-student ratio, (iii) an extremely generous supply of teaching aids, and (iv) generous opportunities for contact with native speakers.

None of these features and arrangements are or can become characteristic of our system of schooling. Successful emulation of such courses is therefore not possible in our schoolrooms.

The main purpose in referring to the two kinds of success stories (the inividual and the corporate wartime) was to show that neither can be depended on exclusively to make our methods the scientific tools that we require to produce the best possible results in our circumstances. They also provide further proof for what was said earlier—that much of what we practise today in the name of method lacks the support of relevant experiment or fruitful practice in circumstances comparable to our own. The result is that in our ignorance and uncertainty we are often unable to tell the class teacher what he should do and why. On some major issues and priorities we fail to rise above the controversies of more than sixty years ago.

What should be done to remove the uncertainties and to put language teaching methodology on firm foundations?

The short answer is quite obvious: there is need for new search and research. But what type of research and for what reasons?

The most fruitful areas for this research and study are as yet largely unexploited. They lie in two directions. First, they lie in researches which satisfy at least the following minimum essentials.

1. They should be carried out in our own schoolrooms and with full recognition of our needs and limitations.
2. They should be carried out on a scale large enough to represent the variations within our system and be of wide enough scope to cover all the aspects of language teaching methodology.
3. They should be adequately controlled in terms of as many variables as possible, the researchers making sure that no undue advantages are allowed to turn the scales in favour of either the control or the experimental groups.
4. They should utilise both pre-tests and post-tests which are

reliable as well as valid for testing the skills involved at different stages.

5. Each of them should last at least three years and, if possible, be carried on up to the final year of the school course.

The second major area of research is related to the first, but it has greater possibilities for fruitful effort.

Dependable researches in the field require long-term experiments in representative settings and under controlled conditions. They require big investments of trained manpower, valuable time and hard-to-come-by money. The answer lies in the pooling together of the separate meagre resources of all those involved in Foreign Language Teaching in this country.

Hitherto, because of reasons of history, English alone was treated as a major foreign language. Now, with changed needs and greater understanding of language and the processes of language acquisition, we have fortunately begun to see that the problems that confront the learners of Hindi in Tamil Nadu or the learner of Malayalam in Uttar Pradesh may have a lot in common with the problems of the learners of English in different parts of the sub-continent. Hardly anything worthy of record, has, however, been done to tackle these common problems as part of a pan-Indian methodology for second (or third) language teaching.

The unsolved common problems of methodology call for a common academic platform for the evolution of a successful approach to second language teaching. For this we need a coming-together of the researchers, the reformers and the enlightened teachers of all the languages in India which are taught as 'foreign' languages. A lot of waste and a good deal of duplicaton of effort can be eliminated if we pool together our resources to undertake classroom-based studies to determine the usefulness and relevance of the best known approaches, methods or techniques.

The coming-together of researchers and teachers of all Indian languages should facilitate another type of research which has particular relevance to the needs and possibilities of Foreign Language Teaching in this country. An example to explain the nature and scope of this research is given below.

Working in the Bengal of 1920, Dr. Michael West conducted a series of experiments to improve the language abilities of Bengali children learning English. As part of these experiments West tried to work on an interesting hypothesis—to find out if there was any 'transfer of training' from reading ability, improved by training, in one language to reading ability in another.

One of the very significant results of West's experiments was the degree of improvement caused in Bengali reading by training in the reading of English. As a result of planned practice, students who showed 232 per cent improvement in the rate of English reading, showed 266 per cent improvement in their Bengali reading. West concluded: "Reading ability is a general power. It is not confined to one language: for improvement in the ability to read one language is 'transferred', and shows itself in improvement of the reading of another language."[9]

In the absence of further researches in this field one cannot say for certain whether West was right. But if he was, a lot of time and effort that is now given to the improvement of reading in the second or third languages ought to become unnecessary with better methods and materials in the teaching of the mother tongue. Also, teachers teaching first languages and those teaching secondary languages should see more in collaboration than they do today.

The problems of transfer of language skills across language boundaries should be treated as common problems by researchers involved in the field of second/foreign languages. They are problems of education rather than of foreign language teaching alone, and they all call for a comon sponsorship of research efforts. They all promise rich rewards in terms of a scientific methodology of Foreign Language Teaching.

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[9] M. West, *Learning to Read a Foreign Language*, Longmans, 1955 (ed.), p. 7.

Behaviour Modification in Teachers by Feedback Using Interaction Analysis[1]

Udai Pareek
T. Venkateswara Rao

The authors report the results of a ten-day training programme conducted with a group of teachers, using feedback on Flanders' Interaction analysis. The results show that as a result of this short training in interaction analysis and feedback on the same, the teachers started using more of indirect patterns of interaction, i.e., praising, encouraging, accepting and clarifying ideas, etc., with their students. The authors also discuss some implications of these results.

A number of techniques are being used currently in India as well as in other countries for the modification of human behaviour. Some of these techniques include T-groups, simulated skill training, interaction analysis, microteaching, role-play, programmed learning, achievement motivation training, etc. These techniques have become the educational innovations during the past decade in the training of teachers, either in-service training or any other form of training. All these innovations, directly or indirectly, make use of the mechanism of feedback.

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[1] This paper is based on data collected in connection with the project, Motivation Training for Mental Health, conducted under a grant from the Indian Council of Medical Research, and forms a part of the project report. Thanks are due to B.R. Sharma and (Miss) D. Banerjee for their help in collecting data and organising the training reported in this study.

The T-group or training group method attempts to bring about change in human behaviour by helping the trainee to view himself, his behaviour with others and the impressions he creates in others during his interactions with them, by putting him in a novel situation in which he interacts with others, gives feedback to others and gets feedback from others. In T-group, data is generated from the group itself in which a member works and such data enables the individual member to become more sensitive about his/her own behaviour as well as that of others. The members are encouraged to experiment with new behaviours. This group requires skilled trainers. Research by a number of investigators indicated change in the behaviour of a majority of the individuals who participate in such training groups, in the desired directions (Stock, 1964; Rogers, 1967).

Role-playing is another training method—a method of interaction that involves realistic behaviour in imaginary situations (Corsini, Shaw and Blake, 1961). This technique attempts to improve the behaviour of an individual or a group, not by talking about a problem but by actually doing something about it. This is done by making people play parts or roles (either their own or of someone else) in a hypothetical or real situation. A great number of techniques are used to make the enactment more meaningful but interaction is the core of the method. This method has been used successfully in a number of training programmes, and especially in problem-solving exercises (Shaw, 1967).

Simulated Social Skill Training or SSST is another method of training. "The general idea behind this is to place a person in a situation to see if he can practise producing certain patterns of behaviour." (Flanders, 1970, p. 248). With teachers in SST exercises, the actor is placed in a position to practise a particular pattern of teaching behaviour, which can be called a social skill, for a short period of time. The observers can practise identifying this skill and learn how to distinguish it from closely related patterns of behaviour. All members of the group have an opportunity to practise controlling their own behaviour for professional purposes. Feedback is given to each actor in the form of opinions and objective data to clarify the relationship between a person's behaviour and the concepts in question.

Microteaching, like SST, is based on the assumption that there are certain patterns of behaviour, or strategies of behaviour, which are crucial to effective classroom instruction. In microteaching each trainee is exposed to an organized curriculum of miniature teaching encounters, moving from the less complex to the more complex. At each step along the way, a teaching strategy is discussed until it can be incorporated into a short teaching lesson of approximately five minutes' duration. The trainee then teaches this lesson in front of a video-camera and a supervisor or some observer, to a group of 4-6 pupils. The video tape is replayed (after the lesson) and the observers discuss with the trainee. With this feedback the trainee attempts to change his teaching behaviour in similar short-time attempts that follow. A teach-reteach cycle is thus enacted (Stanford University, 1967).

Training in achievement motivation is another type of training to change the behaviour of an individual to improve his performance by enhancing the drive in the individual to achieve some standards of excellence. This training is based on the theory that the achievement motive is a driving force in the individual towards growth; it can be measured, and by training it can be created and improved. This theory of McClelland has been tested out in a number of countries and training programmes have been arranged successfully (McClelland, 1969 1969a; Mehta, 1969, 1970; Ojha, 1970). In the achievement motivation training programme each individual is provided with a feedback of his achievement levels after giving him enough theoretical knowledge about the achievement motive as well as the TAT-type tests by which it is measured and interpreted.

The mechanism of feedback has been very effectively used in all these techniques. These techniques and most of the other recent innovations in training are based on the strategy that objective and systematic feedback helps the individual to modify his behaviour in the desired direction. People who do not change may be like that because of lack of feedback. In fact Festinger (1954) in his theory of social comparison processes has postulated the following tendencies in human behaviour.

1. There exist, in the human organism, a drive to evaluate his/her opinions and abilities.
2. To the extent that objective, non-social means are *not* available, people evaluate their opinions and abilities by comparing them with the opinions and abilities of others.
3. The tendency to compare oneself with some other specific person decreases as the difference between his opinion or ability and one's own increases.
4. When an objective, non-social basis for evaluating one's opinion or ability is readily available, persons will not evaluate their opinions or abilities by comparison with others.

Baumgartel (1959) gave a feedback of the results of an attitude study conducted in four of the six accounting departments of a large company, the remaining two being the control groups. The feedback was accompanied by group discussions and meetings about the attitude survey results. Consequent testing showed that the four departments which had feedback improved considerably in their attitudes and motivation.

Research available on various training methods utilising feedback as an instrument in changing human behaviour indicates that feedback has been very effective in achieving this task. The survey of researches by Stock (1964) and the researches by Rogers (1967), McClelland (1969), Roy (1970) and many others repeatedly point out the motivational values of feedback. In fact the whole method of programmed learning is based on the principle of feedback and the assumption that it serves as a reinforcer of correct behaviour (Skinner, 1954, 1958; Crwder, 1959; Briggs, 1958; Pressey, 1950). A number of experiments on learning have demonstrated that knowledge of results by feedback improves learning and that practice works well only when learner sees the results of his practice ((Woodworth and Schlosberg, 1954). The purpose of feedback in interaction analysis is to provide a teacher with information about his verbal statements which permit a comparison with some standard or model of what should happen. In the interaction analysis training the teacher under training is provided with the data of his classroom teaching observed by a trained observer before or during the training. Before the trainee is given the feedback he learns all about interaction analysis, specially the matrix interpretation.

Flanders (1962) conducted a nine-week in-service training programme for 55 teachers. The training programme was based on interaction analysis, and consisted mainly of four steps. In the first step an atmosphere was created where the teachers felt free to express their attitudes and feelings as well as their ideas. The second step was to introduce concepts and theory directly related to the teacher's behaviour and his control of classroom activities. In the third stage the teachers were exposed to six hours of observer training in which each teacher tabulated and interpreted a matrix after observing a colleague. While these three phases took about 16 course hours spread over four weeks, the last step termed by Flanders as the "Work period" lasted for three weeks during which the teachers experimented with the new tools in small groups. During this training no one pattern of teacher influence was advocated. To avoid a single style of teaching, special emphasis was given to the concept "flexibility to teacher influence". It was left to the teachers to interpret their matrices and change or not change their behaviour.

With this kind of design, the 55 teachers made significant gains in the use of indirect statements. Thus feedback in this study helped not only as a research tool but also as a good training strategy as well as an evaluative instrument of in-service training programmes. A number of teacher training programmes that are being carried out in other countries are based on interaction analysis and most of the studies have indicated the effectiveness of interaction analysis (feedback as well as discussions about it) in changing teacher behaviour. Some of these studies include those by Hough and Amidon (1964), Zahn (1965), Kirk (1963), Furst (1967), Mcleod (1966), Hough and Ober (1967), Lohman *et al.* (1968), Bondi (1969), Bowers and Soar (1961), Hill (1966), Soar (1966), Flanders (1963a), Emmer (1967), Jeffs *et al.* (1968), Borg *et al.* (1968), Bondi (1970), Amidon and Powell (1967). In India the only study conducted using the feedback from interaction analysis in changing teacher behaviour is by Biswanath Roy (1970) of the National Council of Educational Research and Training. Roy has reported changes in teacher behaviour due to such feedback but his report does not give any details of such change since Roy aimed at comparing the effectiveness of different feedback strategies than that of interaction analysis alone.

Of the training techniques mentioned so far T-groups, SSST, interaction analysis and microteaching are relatively new in education and they seem to be making their way into pre-service training, in-service training, and also other types of training of teachers (Johnson, 1968). While this is so in other countries like the U.S.A., in India, the teacher training programmes still appear to be tradition bound. The survey by Johnson (1968) as well as the researches published in various educational journals indicate that of all the above four methods, interaction analysis is being most widely used in changing teacher behaviour. These researches also indicate clearly that more objective and systematic feedback is possible through interaction analysis. With a view to experiment with ways of changing teacher behaviour, feedback on interaction analysis was chosen to form the basis of training in this study. The technique of interaction analysis is described in the Appendix.

METHODOLOGY

Training Strategy and Original Design

The study was originally designed to experiment with training the teachers with a view to improving the students' mental health. A few drastic changes had to be brought into the design due to poor cooperation from the educational authorities of the schools selected in this study. The original experimental design is described here and is followed by the modified experimental design. Briefly, in the original design it was thought that an experimental group (E) of 10 Class V teachers from 10 schools, and a control group (C) of 10 Class V teachers from another 10 schools matched with Experimental Schools on a few background variables would be selected. Both experimental and control school teachers would be studied on interaction analysis before training and their students tested for mental health. After this, training would be arranged for the experimental teachers in which a systematic feedback would be given to them using the observations made of interaction analysis. Immediately after the training, both the experimental and control group teachers would be observed again on interaction analysis to see the changes. A few months after the training, i.e., when both the experimental and control teachers had interacted for a considerable amount of time with a new batch of students, they would again be observed and coded on interaction analysis and their new students would be simultaneously tested for their mental health. This design has been schematically represented in Table 1.

TABLE 1

Original Design *

PHASE	EXPERIMENTAL SCHOOLS	CONTROL SCHOOLS
1. *Pre-Training Treatment* Measurement during the last quarter of the year by which time the teachers would have interacted enough with the students and influenced their behaviour (Dec. 69 to Jan. 70).	1. A. *Teachers* Observation and interaction analysis. 1. B. *Students* Testing on PAAS, PADS, PACTS and PAIQ.	1. C. *Teachers* Observation and interaction analysis 1. D. *Students* Testing on PAAS,PADS, PACTS and PAIQ.
2. *Training* Training the teachers in interaction analysis and feedback to them the data collected above (Feb. 70).	2. A. *Teachers* Training 2. B. *Students* No treatment	2. C. *Teachers* No treatment 2. D. *Students* No treatment
3. *Post-Training Treatment I* Measurement to see behaviour change in teachers, About 2 weeks after training (March 70).	3. A. *Teachers* Observation and interaction analysis. 3. B *Students* No treatment	3. C. *Teachers* Observation and interaction analysis 3. D. *Students* No treatment
April to June—Examinations and Summer Vacation		
4. *Post-Training Treatment II* Measurement to see whether changed behaviour is sustained and whether it had any different influence on the new batch of students. (About 3 months after the schools reopened and the new batch joined (i.e., about 6 to 7 months after training—Sept.-Nov. 70).	4. A. *Teachers* Observation and interaction analysis. 4. B. *Students* *(New Batch)* Testing on PAAS, PADS, PACTS and PAIQ.	4. C. *Teachers* Observation and interaction analysis. 4. D. *Students* *(New Batch)* Testing on PAAS, PADS, PACTS and PAIQ.

*Mental Health in this design was proposed to be studied by the instruments PAAS (Pre-adolescent Adjustment Scale), PADS (Pre-adolescent Dependency Scale), PAIQ (Pre-adolescent Initiative Questionnaire) and PACTS (Pre-adolescent Class Trust Scales). For details of these scales see *Indian Educational Review*, 1970, Vol. 5, No. 2, pp. 1-20.

The following questions were proposed to be answered by the original design:

1. Do the teachers change their behaviour as a result of systematic feedback from interaction analysis? (From Table 1 this could be answered by comparing 3.A, and 4.A with 1.A, as well as 3.C and 4.C with 1.C. The hypothesis is that 3.A and 4.A would be significantly different from 1.A whereas 3.C and 4.C would not be significantly different from 1.C.)
2. If the teachers do change their behaviour as a result of systematic feedback from interaction analysis, how sustained will the changes be over a period of 6 months to 8 months? (Differences between 4.A and 1.A as well as between 3.A and 1.A will give the answer.)
3. If the teachers modify their classroom interaction behaviour as a result of systematic feedback, is such change helpful in bringing better attitudes and mental health in their students? (This question becomes redundant if the answers to Questions 1 and 2 above are not positive. This question can be answered by comparing 4.B with 1.B, as well as with 4.D, and also by comparing 4.C with 1.D. If the change in teacher behaviour by motivation training also helps in developing better attitudes in the students, then we expect students of 4.B to have better mental health indices than students of 1.B as well as of 4.D (Or 1.D). Even in case 4.B is better than 1.B but is about the same as 4.D, the positive association between changed mental health could be sustained if 4.D does not differ significantly from 1.D as the students have not been matched on these indices).

Change of Design

To execute the above design 10 experimental and 10 control schools (primary schools) were selected from South Delhi by randomised matched design. The schools in the two groups were matched for the socio-economic background of the locality which they serve, the nature of the schools (boys, girls, co-education), the eagerness of the authorities to participate in the training programme, the medium of instruction, etc. All the schools were run by New Delhi Municipal Corporation. Class V teachers of these schools (10 experimental teachers and 10 control) were observed and coded on Flanders' categories. The students of these teachers were also tested on PAAS, PADS, PACTS and PAIQ for their mental health variables. After completing Phase 1 (1.A, 1.B, 1.C and 1.D) of the design in January 1970, the training programme was arranged for February as shown in the design. When everything was set for the training in February, the administrative authorities in charge of all these schools revised their thinking about sparing the 10 Class V experimental teachers for training. There was a circular saying that the Class V teachers could not be spared for training since they had to devote more time for coaching the outgoing Class V students as the examinations were approaching. Pursuasion did not help and the educational authorities could spare only Class IV teachers. This resulted in a waste of effort and a change in the design.

The Changed Design

In view of this emergency and the pressure to complete the training as well as post-training observation before the middle of March (as preparations for the examinations start around the third week of March) and in view of the lack of availability of trained observers, the idea of controlled groups and student testing had to be dropped in the pre-training (which meant dropping them from the design completely). Hence the objective of the design was modified thus: "to experiment with motivation training of teachers to change their classroom verbal behaviour by a systematic feedback on interaction analysis". However, an attempt was made to support the design by introducing the control group in the post-training phase where time was available for observation. The final design is given in Table 2. The control group could be tested only in the post-training Phases II and III as preparations for the examination started as soon as the observation of the experimental teachers was complete. The control training. The training programme is given in Table 3. The training was conducted on the following lines.

1. The first step was to create an atmosphere in the training programme in which the teachers felt free to express their attitudes and feelings, as well as their ideas.

Special attention was given to this aspect by starting the programme with a 'Whom and I' session in which the teachers were encouraged to talk as much as they liked, without any inhibition, about their own selves, their values, their attitudes towards various things in life including teaching, etc., and so on. The lead was given by the trainers who talked uninhibitedly about their values, merits, and demerits, hopes, fears, etc. The informal atmosphere was kept up throughout the training. On the first day the teachers were told speci-

TABLE 3

Teachers' Classroom Interaction-Behaviour Modification Programme

Time Table

DATE	FORENOON	AFTERNOON
18 Feb. 70	Who am I ?	Values and norms in classroom.
19 Feb. 70	Interaction and classroom climate.	Teacher influence and teaching styles.
20 Feb. 70	Recording interactions—Flanders' technique.	Practice in the use of categories.
21 Feb. 70	Practice in recording and achieving speed.	Practice in schools.
23 Feb. 70	Practice in schools.	Practice in schools.
24 Feb. 70	Practical : Matrix preparation, reliability, etc.	Practical : Matrix preparation, reliability, etc.
25 Feb. 70	Discussion of results of research on interaction patterns of teachers in Delhi.	Feedback and plans for self-improvement.
26 Feb. 70	Experiment in self-change; role-playing.	Practice in schools.
27 Feb. 70	Practice in schools (changed behaviour).	Discussion.
28 Feb. 70	Discussion.	Review and evaluation closing session.

fically that the training was meant to provide them with tools for studying classroom interaction and not evaluate their classroom behaviour or way of teaching. It would be for them to accept the tool or not.

2. The second step was to present the theory and concepts about the classroom, the values and norms in the classroom, the importance of teacher behaviour, the teaching-learning process, the role of the teacher in shaping the classroom climate, etc.

3. The third step was to give them theory and practice in interaction analysis including the coding, tabulation and preparation of the matrix, interpretation of the matrix, etc.

4. The fourth step was to help teachers plan the type of interaction they would like to generate in their classrooms.

5. The fifth step was to give the teachers a feedback of their behaviour as recorded by the trained observers before the training. The teachers themselves interpreted their matrices and planned how they would like to be different from what their matrices showed.

6. The sixth step was to help the teachers experiment with their behaviour. Role-playing was organized in which each teacher took the role of a teacher and the rest the roles of students. Thus they experimented in role-playing with the new patterns of behaviour and attempted to generate interactions of the type they wanted.

7. The seventh step was to enable the teachers to transfer this experimentation in generating the type of interactions they aimed from the role-playing to the actual classroom situations. For this the teachers were taken to a few of the schools in which they were teaching and were given opportunities to teach for short periods. When one teacher was teaching the rest of the teachers observed and gave feedback to the teacher after the session.

8. Finally the teachers were given an opportunity to discuss the various issues that they had faced during the training on interaction analysis, and to organize their experiences with it.

One training strategy adopted during this training was that at no time any evaluative or value component was attached to any of the categories. The teachers were simply told that according to a theory put forward by Flanders, categories 1 to 4 (See Appendix) represent indirect influence, and 5 to 7 direct influence, etc., but they were not told whether indirect behaviour is good or direct behaviour is good. It was left for them to think of it. They were told that research is being conducted to see the influence of each type of behaviour on students. They were given the understanding that it was entirely a personal question whether they wanted to change or not—and if they wanted to change in which direction and to what extent they would like to change was also for them to decide. Interaction analysis, they were told, is only an instrument or a mirror, by using which one can see a dimension of his classroom behaviour.

Post-Training I

About 15 days after the training the nine experimental teachers were again observed and coded for their interactions on Flanders' technique. Each teacher was observed for three periods, each of 20 minutes. Thus, in all 9,482 observations were gathered from 27 periods of observation. From these, a total of 25 matrices (subject-wise for each teacher) were prepared from the data collected. Some of these matrices contained the interactions of the teachers when teaching altogether different subjects for which data was not collected during the pre-training. Hence for final analysis all these matrices could not be taken into consideration.

Post-Training II

About six months after training, another set of observations were collected for the experimental group of teachers. The observations could be collected for only eight teachers as one of the teachers was ill at that time and was not taking any classes. Each teacher was observed for three periods of 20 minutes each and a total of 8,703 observations were collected. Nineteen subject-matter matrices were prepared from these observations.

At this stage the control group of teachers selected earlier but not observed yet, were also observed and coded for their classroom interaction behaviour. Eight teachers only were observed to match the eight experimental teachers. Each teacher was observed for three periods of 20 minutes each. A total of about 7,663 observations were collected and 18 subject-matter matrices were prepared.

Post-Training III

To find out the consistency of interaction patterns in the control group and to make comparisons with the experimental group about four to five months after Pre-training II, another set of observations were collected from the control group of teachers. A total of 7,965 observations were gathered and 23 matrices were prepared. The assumption to be tested was that, "the control group of teachers will not show significantly different behaviour when tested on two different occasions not interspersed by any kind of training".

DATA ANALYSIS

The following analyses were done to test the impact of training on experimental teachers.

1. The sign test was applied to test the null hypothesis that the percentage occurrence of each category would not change significantly (or would change positively in half the cases and negatively in the other half) in the experimental group of teachers after training. For this purpose the percentages of occurrence of each category from the observations of 15 subject-matter periods (from 15 matrices) of experimental teachers before training (pre-training) were compared with the percentages of occurrence of the same category from the observations of the corresponding 15 subject-matter matrices of the same experimental) teachers after training (post-training I) and the significance of change was tested using the sign test.

2. Similarly the sign test was applied to test the change from Pre-training to Post-training II for each category of the experimental teachers. (Only 13 corresponding subject-matter matrices were available for this purpose, as in the rest of the matrices subjects taught were different.)

3. To test the hypothesis that teachers show changes when observed immediately after training but when tested a few months later the change would fade away, the sign test was applied for each category

dents will become more and moe expressive of their feelings thereby giving an opportunity for the teacher to accept (or reject their feelings). Unfortunately Flanders' categories do not code the expression of feelings by students separately. While there is no way of judging whether this category was not found because the teachers lack it or because the students do not show their feelings, it may be reasonable to assume that the feeling component is very much less in the pre-adolescent classrooms and therefore no radical changes could be expected in category 1 by way of training the teachers alone.

Praising and Encouraging. The effects of training on the experimental group are given in Table 4. The table reveals that after train-

TABLE 4

Mean percentage of occurrence of Category 2, direction of change and significance of change in Category 2 at various periods in the experimental and control groups of teachers

Period of observation	*Mean percentage occurrence of Category 2*	*Direction of change*	*Significance of change*
Pre-training E Post-training I E	 0.78 7.22	Increase of Category 2 in 14 of the 15 matrices.	.001 (sign test)
Pre-training E Post training II E	 0.78 6.47	Increase of the category occurrence in 12 of the 13 matrices.	.002 (sign test)
Post-training I E Post-training II E	 7.22 6.47	Decrease of the category occurrence in 8 matrices and increase in 4 matrices, equal in 1.	Not significant (sign test)
Pre-training E Post-training II C	 0.78 0.36	About 20% more of Post-training II (C) matrices were below common median.	Not significant (median test)
Post-training II E Post training II	 6.47 0.36	All the experimental teachers matrices were above the common median.	Significant beyond .01 level (median test)
Post-training II E Post-training III C	 6.47 0.45	About 90% more of the experimental teachers were above the common median.	Significant beyond .01 level (median test)
Post-training II C Post-training III C	 0.36 0.45	Increased in 4 matrices, decreased in 8 and no change in 6 matrices.	Not significant (sign test)

ing the teachers started using a significantly higher percentage of praising and encouraging acts. This change appears to have been sustained by the teachers for more than six months. The table also reveals that while there was a tendency in some teachers to decrease the use of this category as the time passed. There was also a tendency in a few others to make use of the category increasingly more. The percentage occurrence of this category was significantly more in the experimental group tested about six months after training than in the control group tested about the same time and a bit later. There were no significant difference in the control group tested at two different periods.

From the table it can be concluded that experimental group after training has changed significantly (about 5% to 6% on the average) and is different from what it was before training, as well as from the control group, in praising the students in the class and encouraging them. One precaution again here is that this change was quantitative and no information has been collected about qualitative changes as Flanders' categories do not give such information (intensity of praising and encouraging, not the amount).

Accepting and Clarifying the Ideas of Students and Building on Their Ideas. Table 5 gives the changes and difference in this category in the experimental and control groups. The table reveals similar results as in Category 2. The experimental group of teachers observed after training showed a significant change in the direction of increased use of this category. This was sustained for more than six months. However, the change was more immediately after training and significantly decreased in six months after training, but remaining at significantly higher levels than in the pre-training period. The experimental group of teachers also showed significantly higher utilisation of this category as compared to the control group tested at two different periods. The table shows consistent results in favour of experimental group using more of this category after training. It can be concluded that teachers started using this category more as a result of training.

Questioning. Table 6 reveals similar changes as above in experimental teachers with regard to their use of questions in the class. The experimental teachers seem to have increased putting questions to their students, as a result of training. Immediate observation revealed a decrease in the using of this category only in three matrices, whereas

TABLE 5

Mean percentage of occurrence of Category 3, direction and significance of change in Category 3 at various periods in the experimental and control groups of teachers

Period of observation	*Mean percentage of occurrence of Category 3*	*Direction of change*	*Significance of change*
Pre-training E Post-training I E	1.87 5.47	Increase in the occurrence of the category in 14 matrices and decrease in 1.	.001 level (sign test).
Pre-training E Post-training II E	1.87 3.78	Increase of occurrence in 10 matrices and decrease in 3.	.046 level (sign test)
Post training I E Post-training II E	5.47 3.78	Decrease of occurrence in 11 matrices and increase in 2.	.011 level (sign test)
Pre-training I E Post-training II C	1.87 1.09	About 18% more of the matrices of control teachers were below common median.	Not significant (median test)
Post-training II E Post-training II C	3.78 1.09	About 61% more of the matrices of experimental teachers were above the common median.	Significant beyond .01 level (median test)
Post-training II E Post-training III C	3.78 0.63	About 90% more of the matrices of experimental teachers were above the common median.	Significant beyond .01 level (median test)
Post-training II C Post-training III C	1.09 0.63	Decrease of occurrence in 12 matrices and increase in 6.	Not significant (sign test)

observations after six months revealed the decrease. The experimental group of teachers after training used this category significantly more as compared to the control group who did not have the training. From the table it may be concluded that due to the training most of the teachers increased significantly the number of questions they put in the class to students. There was a negative change in the control teachers—to use this category less when observed for the second time (Post-training III) as compared to the first (Post-training II).

TABLE 6

Mean percentage of occurrence of Category 4, direction of change and significance of changes in the experimental and control groups of teachers

Period of observation	*Mean percentage of occurrence of Category 4*	*Direction of change*	*Significance of change by sign test*
Pre-training E Post-training I E	9.66 16.13	Increase in 12 matrices and decrease in 3 matrices.	·018 (sign test)
Pre-training E Post-training II E	9.66 12.75	Increase in 8 matrices and decrease in 5 matrices.	Not significant (sign test)
Post-training I E Post-training II E	16.13 12.75	Increase in 2 matrices and decrease in 11 matrices.	·011 (sign test)
Pre-training E Post-training II C	9.66 7.96	About 12% more of the matrices of control teachers were below the common median.	Not significant (median test)
Post-training II E Post-training II C	12.75 7.96	About 48% more of the matrices of experimental teachers were above common median.	Significant at ·05 level (median test)
Post-training II E Post-training III C	12.75 4.92	About 90% more of the matrices of experimental teachers were above the common median.	Significant at ·01 level (median test)
Post-training II C Post-training III C	7.96 4.92	Decrease in 14 matrices and increase in 4 matrices.	·015 level (sign test)

Lecturing. Table 7 on lecturing reveals very few significant changes and differences in the experimental group. The table reveals that due to training there was a tendency in the experimental teachers to lecture less than earlier. This was significant only when they were observed soon after the training and thereafter there seems to have been an increase in the use of Category 5, though it was less than that at the time of pre-training. The experimental group observed six months after training were not highly different from the control group tested at the same time, though there was a tendency (not significant) in the experimental group to use lecturing to a lesser degree.

TABLE 7

Mean percentage of occurrence of Category 5, direction of change and the significance of change in the occurrence of Category 5 in the experimental and control groups at different periods

Period of observations	*Mean percentage of occurrence of Category 5*	*Direction of change*	*Significance o change*
Pre-training E Post-training I E	 50.89 34.62	Decrease in 11 matrices and increase in 4 matrices.	·059 level (sign test)
Pre-training E Post-training II E	 50.89 39.64	Decrease in 8 matrices, increase in 5 matrices.	Not significant (sign test)
Post-training I E Post-training II E	 34.62 39.64	Decrease in 5 matrices, increase in 8 matrices.	Not significant (sign test)
Pre-training E Post-training II C	 50.89 48.37	About 13% of the matrices of control teachers were below common median.	Not significant (median test)
Post-training II E Post-training II C	 39.64 48.37	About 22% more of the control teachers were above common median.	Not significant (median test)
Post-training II E Post-training C	 39.64 45.67	About 10% more of the control teachers were above the common median.	Not significant (median test)
Post-training II C Post-training III C	 48.37 45.67	Decrease in 9 matrices and increase in 9 matrices.	Not significant (sign test)

Directing. As can be seen from Table 8, there does not seem to be much of a change in the experimental group in using this category. There was a tendency shown by a few experimental teachers to use this category less, but this was not significant as the sign tests were not significant. The experimental group after training did not also differ much from the control group. However, it is interesting to note in Table 8 that the control group when tested the second time (Post-training III) showed change in the direction of using this category to a lesser extent. Hence the little changes occurring in the experimental group could be a natural process rather than the result of training.

TABLE 8

Mean percentage of occurrence, direction of change and significance of change in the occurrence of Category 6 for the experimental and control teachers at different points of time

Period of observation	*Mean percentage of occurrence of Category 6*	*Direction of change*	*Significance of change*
Pre-training E Post-training I E	 4.34 3.99	Decrease in 8 matrices and increase in 7 matrices.	Not significant (sign test)
Pre-training E Post-training II E	 4.34 3.05	Decrease in 9 matrices and increase in 4 matrices.	Not significant (sign test)
Post-training I E Post-training II E	 3.99 3.05	Decrease in 7 matrices and increase in 6 matrices.	Not significant (sign test)
Pre-training E Post-training II C	 4.34 5.48	About the same per cent matrices in both groups were below and above the common median.	Not significant (median test)
Post-training II E Post-training II C	 3.05 5.48	About 25% more of the matrices of control teachers were above the common median.	Not significant (median test)
Post-training II E Post-training III C	 3.05 2.51	About 25% more of the matrices of experimental group were above the common median.	Not significant (median test)
Post-training II C Post-training III C	 5.48 2.51	Decrease in 13 matrices and increase in 5 matrices.	.048 level(sign test)

Criticizing and Justifying Authority. Table 9 on Category 7 also reveals similar trends as for Category 6. Though there was a tendency in the experimental teachers to criticize the students a bit less as a result of training, this was not significant. Comparison with control group also reveals no significant trends. Changes in control group tested at two different times are again interesting, as in Categories 4 and 6. The control group observed at the first time showed significantly more use of this category when compared to the experimental group before training as well as the control group itself when tested after four months.

In conclusion the table reveals no significant change in the experimental teachers in using this category but only a tendency to use it less.

TABLE 9

Mean percentage of occurrence, direction of change and significance of change in occurrence of Category 7 for the experimental and control teachers at different periods of observation

Period of observation	*Mean percentage occurrence of Category 7*	*Direction of change*	*Significance of change*
Pre-training E Post-training I E	 0.84 0.29	Decrease in 9 matrices and increase in 3 matrices (no change in 3)	.073 (not significant) (sign test)
Pre-training E Post-training II E	 0.84 0.51	Decrease in 5 matrices and increase in 5 matrices (no change in 3)	Not significant (sign test)
Post-training I E Post-training II E	 0.29 0.51	Increase in 7 matrices and decrease in 3 matrices (no changem 3)	Not significant (sign test)
Pre-training E Post-training II C	 0.84 2.55	About 39% more matrices of control group were above common median.	Significant at .05 level. (median test)
Post-training II E Post-training II C	 0.51 2.55	About 11% more matrices of the control group were above common median.	Not significant (median test)
Post-training II E Post-training II C	 0.51 0.33	About 11% more matrices of the control group were above common median.	Not significant (median test)
Post-training II C Post-training III C	 2.55 0.33	Decrease in 15 matrices and increase in 2 matrices.	.001 (sign test)

Indirect/Direct Influence Ratios. Tables 10 and 11 give the changes in indirect/direct influence ratios as a result of training. Both the tables reveal consistently that the experimental teachers have started using more of indirect influence after training. The improved I/D ratios of the experimental teachers were consistently higher in most of the cases than those of the control teachers, tested at different times. The observation that the experimental teachers had even significantly

TABLE 10

Mean I/D ratios, direction of change and significance of change in I/D ratios of experimental and control groups of teachers at different periods of observation

Period of observation	*Mean I/D ratio*	*Direction of change of I/D ratio*	*Significance of change*
Pre-training E	0.194	I/D ratios increased in all 15 matrices.	.001 (sign test)
Post-training I E	.971		
Pre-training E	0.194	12 I/D ratios increased and 1 decreased.	.002 (sign test)
Post-training II E	0.581		
Post-training I E	0.971	9 I/D ratios decreased and 4 increased.	0.133 (sign test)
Post-training II E	0.581		
Pre-training E	0.194	About 38% more I/D ratios of control teachers were below common median.	Significant at .05 level (median test)
Post-training II C	0.219		
Post-training II E	0.581	About 56% more I/D ratios of experimental teachers were above common median.	Significant at .01 level (median test)
Post-training II C	0.219		
Post-training II E	0.581	About 62% more I/D ratios of experimental teachers were above common median.	Significant at .01 level (median test)
Post-training III C	0.162		
Post-training II C	0.219	12 I/D ratios decreased and 6 increased.	Not significant (sign test)
Post-training III C	0.162		

low I/D ratios before training as compared to the control group further supports the conclusion that as a result of training the experimental teachers have started using more of indirect influence and less direct influence. A significant observation from Table 11 is that the experimental teachers had high i/d ratios even before training. In spite of this, the experimental teachers have still improved on their i/d ratios. The effect of training seems to be in the direction of increasing the indirect influence.

TABLE 11

Mean i/d ratios, direction of change and significance of change in i/d ratios of the experimental and control groups teachers at different periods of time

Period of observation	*Mean i/d ratio*	*Direction of change*	*Significance of change*
Pre-Training E post-training I E	1.367 3.104	Increase in 14 matrices and decrease in 1.	.001 (sign test)
Pre-training E Post-training II E	1.367 3.912	Increase in 12 matrices and decrease in 1.	.001 (sign test)
Post-training I E Post-training II E	3.104 3.912	Increase in 7 matrices and decrease in 6.	Not significant (sign test)
Pre-training E Post-training II C	1.367 0.376	About 24% I/D ratios of control teachers were below common median.	Not significant (median test)
Post-training II E Post-training II C	3.912 9.376	About 48% more I/D ratios of the experimental teachers were above common median.	Significant at .01 level (median test)
Post-training II E Post-training III C	3.912 0.974	About 70% more I/D ratios of the experimental teachers were above common median.	Significant at .01 level (median test)
Post-training II C Post-training III C	0.376 0.974	Increase in 9 matrices and decrease in 9.	Not significant (sign test)

Student Talk. Tables 12 and 13 give the results about student talk. It may appear at the outset that it is unreasonable to expect much change in student talk as it is the teachers who were trained and not the students. On the other hand it may also be reasonable to expect that, since interaction is always between the teacher and the student, any change in teacher behaviour may mean a corresponding change in student interaction behaviour. However, the later hypothesis does not seem to be supported by the data as revealed by Tables 12 and 13.

TABLE 12

Mean percentage of occurrence, direction of change and significance of change in occurrence of Category 8 for the experimental and control groups of teachers at different periods of observation

Period of observation	*Men percentage occurrence of Category 8*	*Direction of change*	*Significance of change*
Pre--Training E Post-training I E	16.29 17.24	Increase in 7 matrices ,and decrease in 8 matrices	Not significant (sign test)
Pre-training I E Post-training II E	16.29 18.02	Increase in 6 matrices and decrease in 7	Not significant (sign test)
Post-training I E Post-training II E	17.24 18.02	Increase in 6 matrices and decrease in 7	Not significant (sign test)
Pre-training E Post-training II C	16.29 23.22	About 12% more of control classes were above the common median	Not significant (median test)
Post-training II E Post-training II C	18.02 23.22	About 16% more of the control group were above common median	Not significant (median test)
Post-training II E Post-training III C	18.02 35.30	About 4% more of control group were above common median	Not significant (median test)
Post-training II C Post-training III C	23.22 35.30	Increase in 12 matrices and decrease in 6	Not significant (sign test)

TABLE 13

Mean percentage of occurrence, direction of change and significance of change in occurrence, of Category for the experimental and control groups observed at different periods

Period of observation	Mean percentage occurrence of Category 9	Direction of change	Significance of occurrence
Pre-training E	3.10	Increase in 9 matrices and decrease in 6 matrices	Not significant (sign test)
Post-training I E	6.51		
Pre-training E	3.10	Increase in 7 matrices and decrease in 6.	Not significant (sign test)
Post-training II E	4.80		
Post-training I E	6.51	Decrease in 7 matrices and increase in 6	Not significant (sign test)
Post-training II E	4.80		
Pre-training E	3.10	About 38% of control classes were below common median	Significant at .05 level (median test)
Post-training II C	1.51		
Post-training II E	4.80	About 38% more of experimental classes were above the common median	Significant at .05 level (median test)
Post-training II C	1.51		
Post-training II E	4.80	About 56% more of experimental classes were above common median	Significant at .01 level (median test)
Post-training III C	0.66		
Post-training II C	1.51	Decrease in 12 matrices and increase in 6	Not significant (sign test)
Post-training III C	0.66		

The tables indicate that there were no significant changes in student talk (self-initiated as well as teacher initiated) as a result of changed interactions of the teachers due to training. Table 11 indicates a significant tendency in the students of experimental schools to show more self-initiated student talk. Whether this could be attributable to training is doubtful as the students of experimental schools showed significantly more of self-initiated talk even before training.

TABLE 14

Mean T/S ratios, direction of change and significance of change in T/S ratios of the experimental and control groups of teachers observed at different periods

Period of observation	*Mean T/S ratio*	*Direction of change*	*Significance of difference*
Pre-training E Post-training I E	3.917 3.459	Increase in 7 matrices and decrease in 8 matrices	Not significant (sign test)
Pre-training E Post-training II E	3.917 3.583	Increase in 6 matrices and decrease in 7 matrices	Not significant (sign test)
Post-training I E Post-training II E	3.459 3.583	Increase in 6 matrices and decrease in 5	Not significant (sign test)
Pre-training E Post-training II C	3.917 6.625	About the same percentage in both the groups were above the common median	Not significant (median test)
Post-training II E Post-training II C	3.583 6.625	About equal percentage in both the groups were above the common median	Not significant (median test)
Post-training II E Post-training II C	3.583 7.646	About 6% more of control teachers were above the common median	Not significant (median test)

Teacher versus Student Talk. Table 14 reveals that there were no significant changes in the teacher-student talk ratios. Though the Mean T/S ratios of experimental classes were low before as well as after training. The median test and sign test are not significant and the mean differences may be due to a few extreme ratios in some classes.

Thus the results presented so far reveal that the training did help the teachers to change their interaction behaviour. As a result of the training they changed significantly in the direction of using more and more acts of praising and encouraging the students, and accepting and clarifying the ideas of the students and building on their ideas and putting more and more questions to students. On these dimensions the trained teachers also differed from the non-trained control teachers. There was also a tendency in the teachers that underwent training to use less of lecturing, directing and criticizing. However, though the changes in the experimental teachers were consistent in most cases, they were not significant statistically. As a result of training the indirect/direct influence ratios of the experimental teachers increased showing more of indirect influence. The increases in I/D and i/d ratios were significant and higher than the I/D and i/d ratios of control groups. There were no significant changes in student talk as well as teacher/student talk ratios due to training. There was a tendency observed in the students of teachers who underwent training to talk in the class more of their own initiative. However, to what extent this was due to the new permissiveness of the changed teachers is not known as the students of these teachers were considerably high in self-initiated talk even before their teachers underwent the training. (Perhaps a better design would have been to control the initial behaviour of experimental and control classes, which could not be done in this study due to various limitations.)

Another significant observation was the significant decrease in the control teachers in using Categories 4, 6 and 7 (questioning, directing and criticizing), by the second testing. What this is due to is not clear and can be attributed to various hypothetical assumptions such as acclimatization of the teacher to the observers' presence. However, these changes do not interfere with the conclusions drawn above; on the other hand they support them as can be seen from the respective tables.

SUMMARY AND IMPLICATIONS

In this research, a ten-day training was given to a group of nine teachers. In the training they were taught about Flanders' technique and the teachers practised coding classroom interactions on Flanders' technique. The classroom interaction patterns of each of the teachers coded by trained observers earlier to the course were fed back to them. On giving such feedback the teachers interpreted their own as well as the other trainees' classroom interaction behaviour categories, and set goals for self-improvement. Post-training observations of the trained teachers as well as a group of untrained teachers at different periods revealed that after the training the teachers started using more and more of Categories 2, 3 and 4 (praising, encouraging, accepting ideas and questioning) and showed a tendency to use Categories 5, 6, and 7 (lecturing, directing, criticizing) a little less than before training. The untrained group did not show any such changes except a tendency to use Categories 4, 6 and 7 less at the second observation period. No differences were observed in the amount of student talk in the trained teachers' classrooms though their students were found to show more of self-initiated talk after their exposure to the trained teachers. Training had increased the I/D and i/d ratios as the trained teachers started using more and more of indirect influence. Without going into the effects of such a change in teachers on their students, and with the limitations of the design, it can be concluded that as a result of training in interaction analysis and in the presence of objective feedback the teachers tend to change towards increased use of praising, encouraging, questioning and accepting the ideas of the students and towards slightly less use of lecturing, directing and criticizing the students. This generalization is at least valid for the Class IV teachers who were the subjects in this study and can safely be extended to any Class IV or V teachers of similar background.

These results have the following implications:

Training on interaction analysis using knowledge and feedback on interaction analysis can bring about changes in teachers' classroom interaction behaviour. Such training requires a very short period of time.

It may be useful for the teacher training colleges in India to give special attention to this. Experimentation may be taken up in a few colleges by way of teaching interaction analysis as well as by using it in the internship programme which may bring more and more awareness in the young teachers about their classroom behaviour. It is quite likely that such training will help them to produce better students. However, any such training in interaction analysis should not be prescriptive in the use any of Flanders' categories; it should be left to the teachers to experiment with new patterns, see the results and then follow the useful patterns.

APPENDIX

The Technique of Interaction Analysis

The interaction analysis technique developed by Flanders was used in the present investigation. Interaction analysis is an observational technique designed to observe and code the classroom verbal behaviour of the teacher every three seconds, using a ten-category system. The observer sits in the classroom and observes what goes on—the interaction between the teacher and the pupils. At the end of each three-second period, he codes what has been going on, and makes a tally in the relevant category. The observations are in sequence. After the observations are completed for a given period, e.g., half an hour, the observer tabulates his observations in the various categories.

The verbal behaviour of the teacher can be coded in ten categories, of which seven deal with teacher talk, two with student talk, and one is for silence and/or confusion. The various categories and their explanations, as borrowed from Flanders are given below. The most important element in this system is the type of influence the teacher uses in the classrooms. As may be seen from the categories below the influence is of two types: direct influence and indirect influence. Of the seven categories dealing with teacher behaviour, the first four deal with the indirect influence pattern, which is characterized by leaving more freedom of action for the student through accepting his feelings, facilitating his participation by praising and encouraging him, accepting his ideas, and stimulating him to talk by raising questions. Categories 5, 6 and 7 deal with the direct influence pattern, in which there is little or no freedom of action to the student. When the teacher lectures continuously, or gives definite directions, and justifies his authority, or reprimands the students, he is using direct influence.

In this system each verbal act of behaviour is categorised and coded only once, and at every three-second period the category number is noted. Whenever a statement can be classified under two categories, the category which has occurred less frequently is preferred.

Frequency-totals of Categories 1 to 4 divided by totals of Categories 5 to 7 give I/D ratios. Frequency totals of Categories 1 to 3 divided by 6 and 7 give i/d ratios which are free of content interaction. These represent indirect/direct influence ratios. Total frequencies of Categories 1 to 7 divided by 8 and 9 give T/S ratios, known as teacher/student talk ratios.

Categories for Interaction Analysis

TEACHER TALK

Indirect Influence

1. *Accepts Feeling*: Accepts and clarifies the feeling tone of the students in a non-threatening manner. Feelings may be positive or negative. (Predicting or recalling feeling are included)
2. *Praises or Encourages*: Praises or encourages student action or behaviour. Jokes that release tension, not at the expense of another ndividual; nodding head or saying, "um hum" or "go on" are included.

Teacher Talk	Indirect Influence	3. *Accepts or Uses Ideas of Student*: Clarifying, building, or developing ideas suggested by a student. As the teacher brings more or his own ideas into play, shift to category 5.
		4. *Asks Question*: Asking a question about content or procedure with the intent that a student answer.
	Direct Influence	5. *Lecturing*: Giving facts or opinions about content or procedure: expressing his own ideas, asking rhetorical questions.
		6. *Giving Direction*: Directions, commands, or orders with which a student is expected to comply.
		7. *Criticising or Justifying Authority*: Statements intended to change student behaviour from non-acceptable to acceptable patterns; bowling someone out; stating why the teacher is doing what he is doing; extreme self-reliance.
	Student Talk	8. *Student Talk—Response*: A student makes a predictable response to teacher. Teacher initiates the contact or solicits student statement and sets limits to what the student says.
		9. *Student Talk—Initiation*: Talk by students which they initiate. Unpredictable statements in response to teacher. Shift from 8 to 9 as student introduces own ideas.
		10. *Silence or Confusion*: Pauses, short periods of silence and periods of confusion in which comunication cannot be understood by the observer.

REFERENCES

Amidon, Edmund and Powell, E. Interaction analysis as a feedback system in teacher preparation. Philadelphia, Pa: Temple University, 1967 (Mimeographed).

Baumgartel Howard. Using employee questionnaire results for improving organisations. *Kansas Business Review*, 1959, 22, 2-6.

Bondi, J.C. (Jr.). The effects of interaction analysis feedback on the verbal behaviour of student teachers. *Educational Leadership*, 1969, 26, 794-799.

Bondi, J.C. Feedback from interaction analysis: some implications for the improvement of teaching. *Teacher Edu.*, 1970, 21 (2), 189-196.

Brog, W.R.. Kallenbach, W., Morris, M., & Fribel, A. The effect of videotape in a teacher training model. Berkeley, California, Far West Laboratory for Educational Research and Development, 1968.

Bowers, N.D. and Soar, R.S. Studies of human relations in the teaching-learning process. Vol. V. Evaluation of laboratory human relations training for classroom teachers. Final Report—Cooperative Research Project No. 8143, U.S. Office of Education, 1961.

Briggs, L.J. Two self-instructional devices. *Psychol. Rep.*, 1958, 4, 671-676.

Corsini, R., Shawm M., and Blake, R. *Roleplaying in Business and Industry*, New York: The Free Press of Glenocoe, 1961.

Growder, N.A. Automatic tutoring by means of intrinsic programming. In E.H. Galanter (Ed.), *Automatic Teaching: The State of the Art.* New York: Wiley, 1959, pp. 109-116.

Emmer, E.T. The effect of teacher use and acceptance of student ideas on student verbal initiation. Unpublished Doctoral Dissertation, The University of Michigan, 1967.

Festinger, Leon. A study of social comparison processes. *Human Relations*, 1954, 7, 117-140.

Flanders, N.A. Intent, action and feedback: a preparation for teaching. *J. Teacher Edu.*, 1963, 14 (33), 251-260.

Flanders, N.A. *Analysing Teaching Behaviour.* Addison-Wesley, 1970.

Furst, Norma. The effects of training in interaction analysis on the behaviour of student teachers in secondary schools, in E.J. Amidon and J.B. Hough (Eds.), *Interaction Analysis: Theory, Research and Application.* Reading, Mass: Addison-Wesley, 1967, pp. 315-328.

Hill, W.M. The effects on verbal teaching behaviour of learning interaction analysis as an in-service education activity. Unpublished Doctoral Dissertation, The Ohio State University, 1966.

Hough, J.B. and Ober, R. The effect of training in interaction analysis on the verbal teaching behaviour of pre-service teachers. In E.J. Amidon and J.B. Hough (Eds.), *Interaction Analysis: Theory, Research and Application.* Reading, Mass: Addison-Wesley, 1967, 329-345.

Hough, J.B. and Amidon, E. An experiment in pre-service teacher education. Paper presented at the Meeting of the American Educational Research Association, Chicago, Illinois, 1964.

Jeffs, G.A., Foss, J., Hollingshead, L., Mills, G., and Reese, D. The effects of training in interaction analysis on the verbal behaviour of teachers Mimeographed Research Report, (Ed), W. Clark High School, Las Vegas, Nevada, 1968.

Johnson, J.A. *A National Survey of Student Teaching Programs.* Final Report—Cooperative Research Project No. 6-8182, U.S. Office of Education, Northern Illinois University, 1968.

Kirk, J. Effects of teaching the Minnesota system of interaction analysis to intermediate grade student teachers. Unpublished Doctoral Dissertation, Temple University, 1963.

Lohman, E., Ober, R., and Hough, J.B. A study of the effect of pre-service training in interaction analysis on the verbal behaviour of student teachers. In E.J. Amidon and J.B. Hough (Eds.), *Interaction Analysis: Theory, Research and Application.* Reading, Mass: Addison-Wesley, 1967, pp. 346-359.

McClelland, D.C. and Winter, D.G. *Motivating Economic Achievement.* Free Press, New York, 1969, p. 395.

McClelland, D.C. Achievement motivation training for potential high school drop-outs. Harvard University, Department of Social Relations. Unpublished paper, 1969a.

McLeod, R.J. Changes in verbal interaction patterns of secondary science student teachers who have had training in interaction analysis and the relationship of these changes to the verbal interaction of their cooperating teachers. Unpublished Doctoral Dissertation, Cornell University, 1966.

Mehta, Prayag and Dandia, P.C. Motivation training for educational development: A follow-up study of bright achievers: *Ind. Educl. Rev.,* 1970, 5 (2), 64-73.

Mehta, Prayag. *Achievement Motivation in High School Boys.* New Delhi: National Council of Educational Research and Training, 1969.

Ojha, J.M. Training for the development of achievement motivation. *Haryana J. Edu.,* 1970, 3 (1), 17-23.

Pressey, S.L. Development and appraisal of devices of providing immediate automatic scoring of objective tests and concomitant self instruction. *J. Psychol.,* 1950, 29, 417-447.

✓Roy, Biswanath. Changing behaviour through freedback. Unpublished Research Report. National Institute of Education (DEPFE), New Delhi, 1970, p. 34.

Shaw, MalColm E. Role playing in *Training and Development Handbook* (Eds.), Craig, R.L. and Bittel, L.R. McGraw Hill Book Company, 1967, 206-224.

Skinner, B.F. The science of learning and the art of teaching. *Harvard Educl. Rev.,* 1954, 24, 86-97.

Skinner, B.F. Teaching machines. *Science,* 1958, 128, 969-977.

Soar, R.S. An integrative approach to classroom learning. Final Report, Public Health Service Grant No. 5-R11 MH 01096 to the University of South Carolina and Grant No. 7-R11 MH 020-45 to Temple Univ., Temple University, 1966.

Stanford, University. Stanford teacher education program, *Microteaching:*

A Description. Stanford Teacher Education Program, Stanford University, Palo Alto, California, 1967.

Stock, Dorothy. A Survey of Research on T-groups. In L.P. Bradford, J.R. Gibb, and K.D. Benne (Eds.), *T-group Theory and Laboratory Method.* New York: Wiley and Sons, 1964, pp. 395-441.

Woodworth, R.S. and Schlosberg, H. *Experimental Psychology.* New York: Holt, 1954 (Rev. Ed.).

Zahn, R. The use of interaction analysis in supervising student teachers. Unpublished Doctoral Dissertation, Temple University, 1965.

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Sex of the Teacher as a Factor of Teacher Classroom Behaviour

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This study was undertaken to find out the relation, if any, between the sex of the teacher and the teacher's classroom behaviour. Flanders' ten-category system of observation was used. The sample consisted of 16 male and 16 female teachers teaching science in the upper primary schools of Madras. Every teacher was observed for two spells of 30 minutes each. Separate matrices were prepared for each teacher. Two 'master' matrices, one for each sex, were prepared through the process of cell-by-cell addition, and Darwin's Likelihood Ratio Criterion Test, meant for verifying the significance of interdependence amongst category sequences, was done for the two 'master' matrices. On t-tests, significant differences were found between male and female teachers in respect of: (a) their capacity to generate student talk, (b) their questioning ratio, and (c) their content emphasis.

The classroom verbal behaviour of the teacher has been a subject of study both in India and abroad. In India, it is becoming increasingly evident that any improvement in education has perforce to come through better techniques of classroom instruction, and for nearly a decade now researchers and others professionally involved in education have been grappling with the problem of studying 'the teacher in the classroom'.

Earlier researches have unmistakably shown that the teacher's classroom behaviour generally decides what is called the 'classroom climate'. An 'integrative' approach in contradistinction to the 'dominative' attitude on the part of the teacher makes pupils show more spontaneity and initiative (Anderson and his group, 1939, 1945, 1946 and 1946).

John Withal (1951) came out with his "climate index" which is a measure of 'learner-centred' climate in the classroom with the implication that it contributes to more learning.

More recently, Flanders' (1965) contribution in this area has been the development of a ten-category system (Table 1) by means of which the teacher's classroom verbal behaviour, vis-a-vis, students' participation can be observed, quantified and analysed for assessing the 'indirect' and 'direct' components of the former.

The different terminological descriptions by different authors, in substance refer to only the two distinctly opposite traits of teacher talk in the classroom. In Flanders' language the 'indirect' influence of the teacher, which is characterised by a sort of permissiveness, allows and encourages student participation to a greater extent, while a 'direct pattern' requiring invariably strict compliance will restrict freedom.

As for the impact on pupil achievement, Flanders found that where goal-perception on the part of the pupils is not present, an 'indirect' teacher behaviour is likely to lead to more learning (Flanders, 1965). In Indian conditions, one may safely assume that, more often than not, that condition characterises our student population in schools. While we make such a surmise, however apparently plausible, we do not blind ourselves to the need for identifying on empirical evidence the areas where a 'direct' approach by the teacher might be more useful.

The decisive influence exerted by the type of teacher's verbal behaviour in the classroom on pupil achievement justifies a thorough and systematic exploration of the factors that affect such teacher behaviour. The problem is multidimensional and since we are at the exploratory stage our attack on the problem has to be in respect of selected variables. Even for one variable it cannot be said that a single study based on a particular sample will yield the last word on the type of relationship that exists between the variable and the criterion. The results will need confirmation through replication of studies. It is possible that results of different *research* studies may turn out to be mutually contradictory. Hence, the process of discovery is a long and continuous one, requiring sustained effort.

The present study is one such attempt on a small scale to decipher the relationship that exists (or, does it?) between the sex of the teacher and teacher's classroom behaviour.

OBJECTIVE

It is believed that sex of the teacher may be found to be a crucial variable in the scheme of things. Hence, the objective of this study is to seek an answer to the question, "Does the sex of the teacher in any way affect the teacher's classroom behaviour?"

PROCEDURE

1. *The Tool*

Flanders' ten-category system of classroom interaction analysis is used for this study. The tool, an observation tool, designed to measure only the verbal communication in the classroom, is made up chiefly of three major components—teacher talk, student talk, and silence. Further subdivision of teacher talk into 'indirect' and 'direct' parts and of student talk into 'responsive' and 'self-initiated' parts points to the possible crucial causal relationships that subsist between them. The tool is reproduced in Table 1. (on the next page).

TABLE I*

*Flanders' Interaction Analysis Categories***

TEACHERS TALK	RESPONSE	1. Accepts feeling. Accepts and clarifies an attitude or the feeling tone of a pupil in a non-threatening manner. Feelings may be positive or negative. Predicting and recalling feelings are included.
		2. Praises or encourages. Praises or encourages pupil action or behaviour. Jokes that release tension, but not at the expense of another individual, nodding head, or saying "Umhm"? or "Go on" are included.
		3. Accepts or uses ideas of pupils. Clarifying, building or developing ideas suggested by a pupil. Teacher extensions of pupil ideas are included but as the teacher brings more of his own ideas into play, shift to category five.
	INITIATION	4. Asks questions. Asking a question about content or procedure, based on teacher ideas, with the intent that a pupil will answer.
		5. Lecturing. Giving facts or opinions about content or procedures; expressing his own ideas, giving his own explanation, or citing an authority other than a pupil.
		6. Giving directions. Directions, commands, or orders to which a pupil is expected to comply.
		7. Criticizing or justifying authority. Statements intended to change pupil behaviour from non-acceptable patern; bawling someone out; stating why the teacher is doing what he is doing; extreme self-reference.
PUPIL TALK	RESPONSE	8 Pupil-talk-response. Talk by pupils in response to teacher Teacher initiates the content or solicits pupil statement or structures the situation. Freedom to express own ideas is limited.
	INITIATION	9. Pupil-talk-initiations. Talk by pupils which they initiate. Expressing own ideas; initiating a new topic; freedom to develop opinions and a line of thought, like asking thoughtful questions; going beyond the existing structure.
	SILENCE	10. Silence or confusion. Pauses, short periods of silence and periods of confusion in which communication cannot be understood by the observer.

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*Taken from *Analyzing Teacher Behaviour* by Flanders. Addison-Wesley Publishing Company, 1970.

**There is no scale implied by these numbers. Each number is classificatory; it designates a particular kind of communication event. To write these numbers down during observation is to enumerate, not to judge a position on a scale.

2. *Training*

Preceding the observational study, the investigator received extensive training in observation. The inter-observer reliability using Scott's coefficient of correlation was found to be consistently above 0.85. This standard normally meets the requirements of reliability of the observations.

3. *Sample*

The sample consisted of 16 male teachers and 16 female teachers teaching in primary and upper primary schools in Madras. Since it was felt that the content taught might also be an important factor operating in the field, it was controlled. All the teachers in the sample were science teachers.

Scheme of Observations

The plan was such that each teacher was observed twice, for 30 minutes duration each time. The sample of each teacher's classroom behaviour constituted one full hour of classroom interaction. It was further ensured that the second observation episode was, in respect of the content taught, the continuation of the unit taught in the first episode.

As for novelty effect it was sought to be offset through a number of devices. The choice of teachers slated for observation was made following their voluntary offer. Also, the commencement of recording the observation was timed a few minutes after the beginning of the instructional session. This spell of a few minutes, it was thought, would enable the teacher to reconcile himself to the presence of the observer and settle down to his 'normal self' without exhibiting unnatural (to him/her) traits of behaviour.

A set of conventional guidelines were followed in the matter of encoding the observations. That would add to the consistency and reliability of the observations. In keeping with the guidelines, there were certain spells of activity or inactivity which had to be disregarded, keeping however a marginal note thereof so as to aid interpretation at a later stage. On account of these 'disregarded' spells, the 'effective' observation period differed from teacher to teacher.

In accordance with the procedures of observation associated with Flanders' scale of ten categories, the rhythm of encoding the verbal communication was approximately one for every three seconds. The columns and columns of numbers recorded, later lent themselves to be cast on ten-by-ten matrices. There was one matrix for every teacher, prepared to cover the one combined hour of interaction.

Matrix Tabulation and Interpretation of Data

Perhaps the chief merit of Flanders' system of observation lies in the provision for the preservation of the sequential nature of the occurrence of communication events in the classroom. The preservation, of course, is limited to two events at a time. In other words, while one can say which event preceded which or followed which, one cannot determine, for example, which pair of events, preceded or followed which other pair of events.

There can be no gainsaying the fact that the extent to which we succeed in 'preserving' the sequential nature of the events will influence our attempts to explore the causal relations that subsist between different events. Strategies of effective teaching can be developed only when we delve deeper and deeper into the causal structure of the succession of events.

It may be pertinent here to state that the present investigators are working on alternative devices which might help to preserve more than a 'pair' at a time—say, for example, a 'tetrad' of events. Some practical difficulties are being encountered. But the process of perfecting a suitable device in the place of the conventional ten-by-ten matrix continues. Perhaps, a breakthrough in this direction may soon be achieved.

Since this study required a comparative approach between male and female teachers, the matrices of all the 16 male teachers were 'combined' to yield a master matrix for 16 male teachers. Similarly, a master matrix for the 16 women teachers was evolved.

However, as an essential step, the two frequency matrices were subjected to the 'Darwin' test of significance. The results are discussed later in this paper. The two combined matrices are reproduced in Tables 2 and 3.

TABLE 2

Combined Matrix of 16 Male Teachers

	1	2	3	4	5	6	7	8	9	10	Total
1	1	—	—	—	2	1	—	—	3	1	8
2	—	67	84	160	223	28	5	198	49	146	960
3	—	4	78	43	146	9	2	7	17	33	339
4	—	20	5	125	49	7	6	642	211	181	1246
5	2	125	20	395	5508	134	40	152	287	472	7135
6	—	4	7	42	48	70	28	167	19	222	607
7	—	9	2	25	54	50	33	26	16	109	324
8	—	554	37	129	274	79	34	1199	34	273	2613
9	5	109	92	86	250	39	49	—	98	164	892
10	—	68	14	241	581	190	127	222	158	537	2138
Total	8	960	339	1246	7135	607	324	2613	892	2138	16262

TABLE 3

Combined Matrix of 16 Female Teachers

	1	2	3	4	5	6	7	8	9	10	Total
1	—	—	—	1	2	1	1	3	3	1	12
2	—	91	107	153	209	47	11	487	68	134	1307
3	—	10	136	72	178	4	1	20	25	30	476
4	—	20	4	131	58	14	12	877	185	221	1522
5	—	69	15	507	3427	55	28	205	128	231	4665
6	—	13	4	73	31	39	34	140	32	186	552
7	—	8	3	44	44	50	72	59	28	117	425
8	1	920	100	225	272	150	95	1588	39	289	3679
9	9	111	75	59	123	42	62	23	132	181	817
10	2	65	32	257	321	150	109	277	177	296	1686
Total	12	1307	476	1522	4665	552	425	3679	817	1686	15141

GENERAL DISCUSSION AND INTERPRETATION

At the stage of inquiry, namely, the interpretation and discussion of the striking features of the matrices of the two different groups, a decision is required as to the type and amount of probe to be undertaken. As for the possibilities, any amount of discussion pertaining to the individual as also the combined matrices could be entered into. Chiefly, the purpose of the inquiry has to guide the making of a judicious choice. But, in order to highlight certain background aspects of the interaction sequences, investigator's discretion to include somewhat general descriptions of the sequential patterns in the matrices is not wholly unwarranted.

Subsequently, an analysis of the two combined master matrices will be taken up for obtaining information in terms of certain popular interaction indices.

How Much Time was Involved?

Since the average rate of coding as stipulated is one tally for every three seconds the total number of tallies entered in the two 'matrices' provide us the data about the elapsed time. The elapsed time was 13 hours 33 minutes and 6 seconds, for males (16262 divided by 20, minutes) while it was 12 hours 37 minutes and 3 seconds, for female teachers (15141 divided by 20, minutes). This would mean that in the case of female teachers more time passed by during which events outside the purview of the observational scale occurred which therefore had to be ignored.

The Relative Proportions of Teacher Talk, Pupil Talk and Silence or Confusion

Usually the teacher is at a vantage point in respect of monopolising the talking time since always it is in the teacher that power, authority and initiative lie, and the students are at the receiving end of the pipeline. Three commonly used proportions, though believed to be in a way crude indicators, do bring about the relative emphasis on the predominant occurrence of teacher talk (T.T.) in the classroom. In the present sample the male teachers talk 65.3 per cent allowing the students to talk 21.6 per cent, which situation leaves silence or confusion at 13.1 per cent level. The women teachers, on the other hand, appear to be less talkative, with 59.2 per cent, since they allow student talk (S.T.) to go up to 29.7 per cent. In the classrooms of women teachers, therefore, the occurrence of silence or confusion (S.C.) is left at the level of 11.1 per cent.

In order to facilitate an estimate of their approximation in terms of these three segments of classroom interaction to the normative expectation (Flanders, 1970), we reproduce these percentages in juxtaposition to the normative expectation in Table 4.

TABLE 4

(In percentages)

	Norms	*Male Teachers*	*Female Teachers*
Teacher Talk	68	65.3	59.2
Student Talk	20	21.6	29.7
Silence/Confusion	12	13.1	11.1

Though student talk in both the situations exceeds the norm, it is perceptibly more under female teachers. This is consistent with their lesser teacher talk, which, again, though falling short of the norm in both the situations, is far lesser than the norm in the case of female teachers than of the male teachers.

Teacher Response, Teacher Direction and Pupil Initiation

In the past it was customary for researches in this area, using Flanders' tool, to evolve such measures as I/D and i/d ratios to seek estimates of teachers' direct and indirect influence behaviour patterns. It was found later that in some cases the ratios turned out to be spuriously high or deceptively low and were therefore unreliable.

Hence, Flanders himself (1970), has come out with three alternative measures to describe the three measures.

The Teacher Response Ratio (TRR) represents the teacher's tendency to react to the ideas and feelings of the students. The formula is designed as a per cent figure. The ratio is found by adding category frequencies 1+2+3, multiplying by 100 and dividing by the sum of 1+2+3+6+7.

A Teacher Question Ratio (TQR) is proposed as a measure of the teacher's tendency to use questions when guiding the content oriented part of the classroom discussion. The TQR is calculated by multiplying the category 4 frequency by 100 and dividing by the sum of categories 4 and 5.

To a person familiar with interactoin analysis procedures with Flanders' tool, it must be clear that the TRR ratio is nothing but the 'revised i/d' expressed as a percentage while the TQR is mathematically a novel concept.

The Pupil Initiation Ratio (PIR) indicates what proportion of pupil talk constitutes acts of their initiation. It is calculated by multiplying the frequency in category 9 by 100 and dividing by the sum of all pupil talk.

The norms for these ratios as spelt out by Flanders (1970) and also the respective ratios of the two groups of teachers are given in Table 5.

TABLE 5

(In percentages)

Ratios	*Norms*	*Males*	*Females*
TRR	42	58.4	64.8
TQR	26	14.9	24.6
PIR	34	25.4	18.2

Teacher Reaction Following Student Talk

Invariably the class will be paying more attention to the teacher when he begins his reactions to something a pupil has said. Each communication re-entry of the teacher is crucial in so far as it sets the stage for the ensuing succession of events.

This immediate reaction of teaching to student talk is investigated through analysing the frequency distributions in the 14 cells lying in rows 8 and 9, columns one through seven. Analogous to the TRR and TQR ratios, the following two ratios can serve to highlight the distinctions clearly.

Instantaneous Teacher Response Ratio (TRR 8, 9)[1]

It is a measure of the teacher-tendency to praise or integrate pupil ideas and feelings into the fabric of class discussion, at the moment the pupils stop talking. It is calculated by adding the cell frequencies in rows 8 and 9, columns 1, 2 and 3, multiplying this sum by 100, and dividing this product by the total tallies in the cells of rows 8 and 9, columns 1, 2, 3, 6 and 7.

Instantaneous Teacher Question Ratio (TQR 8, 9)[2]

This measures the tendency of the teacher to put questions on his own ideas, as distinct from lecturing, following pupil talk. This is calculated by adding the frequencies in the cells (8–4)+(9–4), multiplying the sum by 100, and dividing by the total tallies in the four cells (8–4)+(8–5)+(9–4)+(9–5).

The normative expectations for these ratios as given by Flanders (1970), and the ratios applying to the two matrices under study are given in Table 6 below.

TABLE 6

(In percentages)

Ratios	*Norms*	*Males*	*Females*
TRR 8,9	60	80	78
TQR 8,9	44	29	42

The TRR (8, 9) ratios for the two groups show that they do not very much differ in terms of reacting to pupils' ideas and feelings with praise or encouragement, in contrast with directions or criticism. Also, both these are above the norm.

The TQR (8, 9) ratios, however, indicate that female teachers were much more likely to move on to putting a question, compared to lecturing, than were the male teachers, at the termination of student talk. Further, in resepct of TQR (8, 9) ratios, while the female

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[1&2] The numbers in parentheses denote the rows.

teachers nearly approximate to the 'norm', the male teachers score far below it.

Emphasis on Content[a]

Yet another feature of classroom interaction aiding interpretation is what may be called the Content Cross Ratio (CCR) which is the percentage figure of the sum of tallies in columns 4 and 5 (or rows 4 and 5) with reference to the total number of events. An exceptionally high CCR would indicate an unusually great importance shown to subject-matter, that the teacher took a very active role in the discussion and also that motivation and discipline problems were at a minimum.

The ratio for our two groups of teachers (Table 7) works out to 52 per cent for men teachers and 41 per cent for women teachers, indicating a lower emphasis on content by female teachers.

TABLE 7

(In percentages)

Ratio	*Norm*	*Males*	*Females*
CCR	48	52	41

Flexibility in Communication

In the course of discussion, the extent to which the teacher and the pupils are shifting from one category to another is indicated by what may be called a Steady State Ratio (SSR). The higher this ratio, the less rapid is the interchange between the teacher and the pupils. The ratio is the percentage figure of the sum of the ten steady state cells in the matrix (-1, 2-2,......10-10) with reference to the total occurrence of events. The ratio in the case of male teachers is 47 per cent while it is 39 per cent for mefale teachers, indicating more flexibility in communication in classes handled by female teachers.

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[a] Since the sequential patterns of communication connected with content delivery lie in the form of a cross, the ratio is associated with a cross. However, the quantification of content emphasis, it should be noted, should be based either on the two (4 and 5) rows or columns only.

Table 8 seeks to summarise all the ratios discussed in the course of the preceding pages, and may facilitate instant comparison between the two groups.

TABLE 8*

S. No.	*Variable*	*Symbol*	*Norm*	*Males*	*Females*
1.	Total Interaction Time	—	—	13 hrs., 33 mts., 6 sec.	12 hrs., 37 mts., 3sec.
2.	Percent Teacher Talk	T.T.	68	65.3	59.2
3.	Percent Pupil Talk	P.T.	20	21.6	29.7
4.	Percent Silence/Confusion	SC	12	13.1	11.1
5.	Teacher Response Ratio	TRR	42	58.4	64.8
6.	Teacher Question Ratio	TQR	26	14.9	24.6
7.	Pupil Initiation Ratio	PIR	34	25.4	18.2
8.	Instantaneous Teacher Response Ratio	TRR 8,9	60	80	78
9.	Instantaneous Teacher Question Ratio	TQR 8,9	44	29	42
10.	Content Emphasis	CCR	48**	52	41
11.	Sustained Discourse	SSR	—	47	39

*Items 2 and 11 in percentages.

**The Norm for CCR is worked out on the basis of the proportion as spelt out by Flanders, which is 70 per cent Teacher Talk.

Statistical Comparisons

Since our objective is to seek an answer to the question "Does the sex of the teacher affect the teacher's classroom behaviour?", the data have to be subjected to suitable statistical tests for attempting to answer the question with some degree of confidence.

Darwin's Likelihood Ratio Criterion. To find out whether two interaction sequences are significantly different from each other one has to compare the two matrices. Perhaps, the statistical problems involved in comparing matrices are annoying. Each event affects the probabilities that a particular event will follow. This basic interdependence of interaction data renders the use of the chi-square technique inappropriate for this purpose.

John D. Darwin of the Department of Scientific and Industrial Reserach, Wellington, New Zealand has developed a likelihood ratio criterion to test the hypothesis that the frequency distributions in two or more matrices are the same.

He proceeds on the verified conclusion that the chi-square test is insensitive to sequences analysis. His assumption is that interaction sequences are one-dependent or mark off chains which is a much better approximation than the zero-dependent assumption of chi-square. Of course, communication events are, in fact, more than one-dependent, but the additional dependence of three or more events is small by comparison to the dependence between two events.

Given two or more matrices, the null hypothesis concerning the sequential distributions in them can be tested by the following likelihood ratio suggested by Darwin:

$$2[\underset{K}{\Sigma n_{jkl}\log_e n_{jkl}} - \underset{L}{\Sigma n_{j\cdot l}\log_e n_{j\cdot l}} - \underset{M}{\Sigma n_{jk\cdot}\log_e n_{jk\cdot}} + \Sigma n_{j}\,.\log_e n_{j\cdot\cdot}]$$

A dot in place of a suffix means that summation has been carried out over the replaced variable. If logarithms to the base ten are used, the value within the brackets will have to be multiplied by 4.605 instead of two. The standard score "Z" is found by converting the above criterion as follows:

$$Z = \sqrt{2x^2} - \sqrt{2n-1}$$

where n=s (s–1) and s is the number of categories. For two ten-by-ten matrices the formula becomes

$$Z = \sqrt{2x^2} - 13.379$$

When Z is 2.58 or larger, the null hypothesis is rejected at 0.01 level of confidence.

The two matrices given in Tables 1 and 2 were subjected to this test Table 9 gives the data for computing the value of Z.

TABLE 9*

No.	*Matrix*	*Sum of Products of Cell Frequencies and Logarithms*	*Sum of Produts of Row Totals and Logarithms*
1.	Matrix A (Males)	46490.41280	56261.95610
2.	Matrix B (Females)	40955.89420	50888.39050
3.	Matrix C (Males & Females Combined)	96501.13430	116412.71390

* The logarithms used are based to ten.

TABLE 10

Teacher	*Teacher Talk*	*Student Talk*	*Silence Conf.*	*TRR*	*TQR*	*PIR*	*TRR 8,9*	*TQR 8,9*	*CCR*	*SSR*
1	77.13	12.61	9.26	58.82	8.81	23.46	77.46	66.67	66.23	63.81
2	62.14	27.40	10.46	76.87	25.08	17.23	94.87	30.38	49.75	39.21
3	80.62	9.79	9.60	50.71	6.21	62.86	75.68	17.14	67.57	57 69
4	58.29	25.71	16.00	46.27	16.90	7.17	64.71	44.12	47.07	56.53
5	64.24	22 54	13.21	60.36	22.00	60.44	67 44	27.17	50.29	32.78
6	57.38	33.53	9.17	59.60	7.02	9.72	83.78	16.67	48.89	67.41
7	72.50	15.26	12.24	66.80	17.45	25.48	93.00	35.71	47.33	32.85
M 8	65.40	16.38	18.22	38.60	4.81	36 25	58.33	7.69	59.57	59.77
A 9	70.73	12.97	16.30	70.08	24.76	21.37	90.16	73.68	57.76	43.02
L 10	70.33	22.18	7.48	18.38	2.02	22.76	54.29	2.54	58.07	54.28
11	62.02	16.28	21.71	29.27	15.63	16.67	66.00	26.09	42.15	43.80
E 12	52.19	35.72	12.09	78.05	14.25	0.33	89.47	14.29	39.04	45.24
S 13	73.45	15.83	10.71	76.34	15.23	75.19	79.17	28.30	57.86	40.60
14	58.66	22.03	19.31	68.22	17.16	72.73	76 92	23.68	43.35	36.91
15	53.95	30.62	15.43	46.88	14.37	9 68	67.50	21.05	42.10	55.43
16	58.35	27.64	14.00	83.03	51.29	28.00	88.60	60.53	38.08	12.90
Mean	64 90	21.66	13.45	58.02	16.44	30.58	77 34	30.98	50.94	46.20
S^2	73.10	62.34	16.68	342.99	133.13	578.01	160.94	425.94	85.60	198.92
1	75.89	16.37	7.74	84.74	24 03	18.18	85.47	64.00	51.19	39.68
2	36.15	47.66	16.19	38.04	30.28	19.25	54.44	51.85	19.60	44.24
F 3	45.22	48.50	6.28	48.02	12.20	9.76	62.04	57.14	26.84	55.96
E 4	76.07	19.89	4.04	60.59	24.65	19.21	79.61	41.30	56.97	40.00
M 5	72.50	18.71	8.79	73.21	8.55	32.33	84.85	20.83	55.65	51.94
A 6	68.73	24 83	6.44	80.43	33.60	1.35	90.10	66.67	41.81	30.43
L 7	51.76	28.83	19.41	49.30	31.18	49.43	70.10	50.00	34.15	29.48
E 8	25.27	52.05	22.68	11.54	35.16	7.88	100.00	100.00	19.65	58.10
S 9	48.91	44.07	7.01	64.79	32.29	7.95	66.13	30.77	26.63	35.48
10	56.00	29.41	14.60	76.03	26.59	5.82	88.89	35.56	41.29	35.25
11	60 58	27.55	11.87	42.67	29.44	24.92	63.16	37.14	39.70	31.91
12	58.87	26.94	14.19	57.85	22.63	22.44	66.67	17.02	42.97	38.90
13	63.09	24.32	12.59	78.43	24.78	18.82	87.50	24.07	48.50	30.47
14	75.77	16 10	8.13	72.06	16.83	14.14	93.94	22.22	64.72	44.23
15	65 15	22.14	12.70	81.97	32.89	11.48	81.98	66.23	48.55	33.12
16	60 09	28.76	11.16	77.11	21.83	55.22	87.72	47.06	42.27	31.55
Mean	58.75	29 75	11.48	62.29	25 43	19.88	78.91	45.74	41 28	39.42
S^2	213.66	139 02	26.04	403.58	59.72	232.14	177.15	480.80	174 91	85.12

The value of Z was found to be 30.341. This value is far greater than the critical value of 2.58. Hence the null hypothesis is rejected at .01 level of confidence and there is enough evidence to warrant the inference that the male teachers and the female teachers differ significantly in their classroom behaviour patterns, especially in their sequential nature.

2. *Significance of Mean Differences (t–tests).* By way of further examining the data in greater detail t–tests were applied to the individual performance patterns of the two groups of teachers in respect of the ten criteria as shown in Table 10.

In respect of each criterion like 'for example' 'teacher talk' the measures of 16 male teachers were compared with those of the 16 female teachers in terms of t-test. The results of the test are given in Table 11.

TABLE 11

Significance of Mean Difference Tests (t) Between Male and Female Teachers

Sl. No.	*Variable*	*Means*	*Difference in Means* $X_1 - X_2$	*Standard Error of Mean Difference* $S_{\bar{x}_1 - \bar{x}_2}$	*t – ratio* $\frac{X_1 - X_2}{S_{\bar{x}_1 - \bar{x}_2}}$	*Interpretation*
1.	Teacher Talk	64.90—58.75	6.15	4.23	1.4539	Not significant
2.	Student Talk	29.75—21.66	8.09	3.55	2.2789	Significant at .05 level
3.	Silence/confusion	13.45—11.48	1.97	1.60	1.2313	Not significant
4.	TRR	62.29—58.02	4.27	6.83	0.6252	Not significant
5.	TQR	25.43—16.44	8.99	3.47	2.5908	Significant at .02 level
6.	PIR	30.58—19.88	10.70	7.08	1.5113	Not significant
7.	TRR 89	78.91—77.34	1.57	4.60	0.3413	Not significant
8.	TQR 89	45.74—30.98	14.76	7.59	1.9447	Not significant
9.	CCR	50.94—41.28	9,66	4.04	2.3911	Significant at .05 level
10.	SSR	46.20—39.42	6.78	4.21	1.6105	Not significant

DISCUSSION OF THE RESULTS

It is seen from Table 11, how there is evidence to show that the male and female teachers differ in respect of their capacity to generate student talk, questioning ratio and content cross ratio. It is interesting to note how the relative means of the two groups of teachers under the three heads are marked by a certain element of consistency. While in respect of Student Talk and 'TQR' the females score greater means (29.75 is greater than 21.66 and 25.43 is greater than 16.44) in the case of CCR the males are bearing a heavier brunt than females (50.94 is greater than 41.28). This seems understandable since a relatively greater concern for 'content delivery' to the neglect of emotional aspects is likely to be accompanied by a corresponding reduction in the opportunity to the pupils for 'talk' in the classroom.

LIMITATIONS

Perhaps as much can be cited about the study by way of limitations as can be said in acclaim. Interaction analysis is such an area of investigation that, depending upon the time and resources available, the researcher can undertake to fathom the nuances for deeper and deeper insights into the relationships underlying the sequential characteristics of the frequency distributions in the different cells in the matrices.

Especially, some of the latest techniques of exploration like flow patterns of communications, etc., could have heightened the value of this study had they been used. Also, it is to be admitted that the size of the sample is relatively small and such a study as this could be more useful and reliable if done with larger samples.

CONCLUSIONS

By and large, the study has richly helped to test the hypothesis implicit in the title. The answer sought to the question whether the sex of the teacher is in any way an important variable affecting the teacher's classroom verbal behaviour has been obtained. It is found to be 'significantly' influencing at least three aspects of communication, namely, student talk, TQR and CCR. This is confirmatory evidence to the findings of Santhanam, Quraishi and Lulla in *Communication in the Classroom* (Eds. M. B. Buch and M. R. Santhanam, 1970) who reported, although with regard tao a different subject—namely, social studies—student talk under female teachers at 13.292

per cent and under men teachers at 10.489 per cent, and the corresponding figures on CCR as 69.522 per cent and 74.953 per cent, respectively. Also, in the case of teacher talk, wherein the difference is not found to be statistically significant in the present study, the relatively greater tendency for teacher talk on the part of male teachers (64.90 is greater than 58.75) is supportive of the findings in the study cited above where the males talked 82.142 per cent while the females talked only 75.183 per cent.

Studies with larger samples may be undertaken for further evidence on these findings, as also to probe the possible other correlates of classroom teacher behaviour. Such studies, in the ultimate analysis, should help in developing suitable strategies of modifying teacher behaviour such that the teacher gets a reasonable capacity for flexibility to move from one type of behaviour to another depending on the situation. The increasing attention given of late to research in the area of classroom communication unmistakably points to the growing awareness on the part of researchers to the need for evolving a sound theory of instruction which can be inestimably useful in solving the ever-elusive problem of the qualitative improvement of education in India.

REFERENCES

Anderson, Harold H. The Measurement of Domination and of Specially Integrative Behaviour in Teachers' Contacts with Children. *Child Development,* 1939, 10.

Anderson Harold H. Sutdies of Teachers' Classroom Personalities—I: Dominative and Socially Integrative Behaviour of Kindergarten Teachers. *App. Psychol. Monog,* 1945, No. 6.

Anderson, Harold H. Studies of Teachers' Classroom Personalities-II: Effects of Teachers' Dominative and Integrative Contacts on Children's Classroom Behaviour. *App. Psychol. Monog.,* 1946, No. 8.

Anderson, Harold H., Brewer Joseph E., and Reed, Mary Frances. Studies of Teachers' Classroom Personalities—III: Follow-up Studies of the Effects of Dominative and Integrative Contacts on Children's Behaviour. *App. Psychol. Monog.,* 1946, No. 11.

Buch, M. B. and Santhanam, M. R. *Communication in the Classroom.* Centre of Advanced Studies in Education, Faculty of Education and Psychology, M. S. University of Baroda, Baroda, 1970.

Flanders, Ned A. Teacher Influence, Pupil Attitudes and Achievement. LE. 32040, Comparative Research Monograph No. 12. U S. Department of Health, Education and Welfare: Office of Education, 1965, pp. 19-21.

Flanders, Ned A. *Analyzing Teaching Behaviour.* Reading, Mass.: Addison-Wesley Publishing Company, 1970.

Withall, John. The Development of the Climate Index. *J. Educl. Res.,* Vol. XIV, 1951, pp. 93-99.

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Manifest Anxiety in Indian (Delhi) Children

Rajalakshmi Muralidharan
Adarsh Sharma

The authors report a cross-cultural study on anxiety undertaken with the following as its principal objectives: (1) to obtain anxiety test data for Indian (Delhi) children and to examine sex and SES differences within this group, (2) to carry out a cross-cultural comparison in anxiety of children—Indian, American, French and Japanese—based on the data of Iwawaki et al. *The sample consisted of 196 children studying in Class IV and was drawn from two schools charging very high fees, and two charging no fees. The tool used was the Children's Manifest Anxiety Scale. The results showed that: (1) anxiety-scale differences between the two SES groups and between sexes were highly significant; (2) Indian girls and boys of high SES were very much like the Western boys and girls with respect to measured anxiety level, whereas the boys of low SES had significantly higher anxiety scores than American, French and Japanese boys. Indian girls of low SES had significantly higher anxiety scores than*

The authors wish to record here their gratitude to E. L Cowen for stimulating them to the study and for his useful comments, and to Jyotsna Sud for helping in the statistical analysis of the data

Japanese girls but significantly lower scores than American and French girls.

Considerable research interest has recently been shown in the study of anxiety. In 1951, Taylor published the results of an experiment in which the performances of adults in the classical conditioning were found to be related to the scores of a questionnaire relating to anxiety. The questionnaire later came to be known as Taylor's Manifest Anxiety Scale. Subsequently, based on Taylor's Manifest Anxiety Scale, Castaneda, McCandless and Palermo developed in 1956, the Children's Manifest Anxiety Scale. The CMAS, administrable by classroom teachers, consists of 53 items: 42 items (A-Scale) judged by a group of clinical psychologists to be indicative of manifest anxiety, and 11 items (called the Lie Scale) assessing the truthfulness of response. A-Scale items presumably reflect the child's tendency to experience a general and chronic state of anxiety rather than a tendency to experience anxiety in a specific situation. Extensive normative data is available for CMAS. The scale has been used with various age-groups, in different school settings, and within different geographic and cultural areas.

A recent cross-cultural study using the CMAS has been reported by Iwawaki, Sumida, Okuna and Cowen (1967). This study compared Japanese, French and United States children with respect to manifest anxiety. The report by Iwawaki reviews a number of cross-cultural studies on anxiety, both for adults and children, citing certain discrepancies between the two. The relevant studies discussed below are included in the Iwawaki paper.

Cattell and Scheier (1961) conducted a cross-cultural study on six different national groups. Twelve anxiety items were given to 1392 college subjects. Despite the limited numbers of items, an analysis of responses showed striking cultural differences. The various nations ranging from greatest to least of anxiety were: the Polish, the Indian, the French, the Italian, the British and the American (U.S.). The differences in the mean anxiety scores were statistically significant for each comparison.

Similar results were obtained in a subsequent study by Cattell

(1965) except that the Polish group was replaced by a Japanese group. The Japanese scored below the Italians, but above the British and the U.S.A. *Ss*. The finding that Japanese collegians were higher in the anxiety scale than those from U.S.A. is consistent with a series of studies reviewed by Ohmura and Sawa (1957) and with a later study by Tsujioka and Cattell (1965).

Cattell and Scheier (1961) argue that high anxiety is associated with a low standard of living, poverty, and lack of political freedom, and therefore those from the developing countries are likely to show more anxiety. However, Sinha's (1963) findings with Indian collegiates do not support this view. He found that the patterns of manifest anxiety of American and Indian college youth were similar in spite of cultural differences. Perhaps the fact that the Indian sample was exposed to many anxiety-creating situations analogous to those experienced by their Western counterparts accounted for the similarity in the patterns of anxiety shown by the two groups.

With respect to children, Sarnoff, Lighthall, Waite, Davidson and Sarason (1958) found that British and American subjects did not differ significantly in generalized anxiety, but that British children had greater specific test anxiety. This finding was attributed to the greater examination stress in the British examination system. However, Sarnoff *et al* did not find supporting evidence for this in a subsequent study (1959).

Cowen and Danset (1962) found no difference in the total anxiety score between American and French children on the CMAS, although item analysis indicated that each cultural group had its preferred mode of anxiety expression. They found that in both American and French samples, boys were significantly less anxious than girls. The earlier studies of Castaneda *et al* (1956) and Palermo (1959) also showed the same trend in sex differences. But evidence concerning sex differences is not conclusive. The studies of Hafner and Kaplan (1959), Morgan *et al* (1960), Iwawaki *et al* (1967), and Raina (1969) find no sex differences in the anxiety scores. Raina's study needs special mention as it was done on an Indian population. It studied 300 fifth-grade children of middle SES having a mean age of 11 years 2 months, and drawn from the rural areas of Rajasthan.

Raina found that the A-Score and L-Score of the Rajasthan children were significantly higher than those reported by Castaneda. He ascribed the differences to lack of freedom and adventure and gerater restrictiveness in child-rearing.

The contrasting findings of the studies with children and college-age *Ss* led to the study by Iwawaki, Sumida, Okuna and Cowen (1967). The goals of these investigations were to obtain anxiety test data and the CMAS normative profile for young Japanese school-children and, based on the data of Cowen and Danset (1962), to carry out a cross-cultural comparison of Japanese, French and American children. Iwawaki *et al* found that Japanese *Ss* of both the sexes were less anxious than their French and American counterparts. As possible explanations for these findings they suggested that the Japanese mother may be closer to the young child and thus give him more attention than her Western counterpart. This might reduce the likelihood of 'aloneness' and thereby lower the anxiety score in the Japanese child.

Objectives of this Study

The present study extends that of Iwawaki *et al* (1967) with the following as its principal objectives:

1. To obtain anxiety test data for Indian (Delhi) children and to examine sex differences within this group.
2. To test Cattell's theory that cultural deprivation leads to higher anxiety scores.
3. To carry out cross-cultural comparison of children—Indian, American, French and Japanese—based on the data of Iwawaki, *et al.*
4. To compare anxiety scores of young Indian children and Indian adults based on the earlier studies of Cattell and Scheier (1965), Sinha (1963) and Raina (1969).

Method

Translation of the Scale. The original English version of the

CMAS was translated into Hindi, the regional language of the *Ss*. Care was taken to use simple language and to select words and phrases that are easily understood by 9-to-10 year old children. The translated version of the CMAS was administered to a group of 35 *Ss* from Classes III and IV for a pilot study. The purpose of this pre-test was to obtain information about possible difficulties in administration and to check problems of comprehension arising out of the translation. The pilot study showed that the items such as 'I wish I could be far off from here', 'I feel alone even when there are people around me', were not clear to many children, perhaps due to the faulty translation. Such items were later modified to make their meaning more clear in the Hindi version.

The pilot study also revealed that the items were generally beyond the comprehension of Class III youngsters. It was therefore decided to restrict the sample to the children drawn from Class IV.

The final Hindi version of the CMAS corresponded exactly with the English version, both in content and in the order of presentation of items. It was found to have a test-rest reliability of .80.

Sample. The sample used in the present investigation was drawn from four schools in Delhi, two of which charged very high fees, and the other two, no fees at all. The assumption was that the upper middle class SES children attended the high-fee schools whereas the low or lower middle class SES children attended the free schools. This assumption was verified using fathers' occupations as the index of socio-economic strata. Table 1 gives the detailed distribution of the sample.

TABLE 1

Distribution of Children according to Fathers' Occupations

Father's Occupation	*No. of Children in Each Category*	
	HIGH-FEE SCHOOLS	FREE SCHOOLS
Professional	33	—
Managerial and big business	30	—
Supervisory	9	—
Skilled workers	3	5
Adopted by foreigners	4	0
Minor clerical & minor business	1	28
Semi-skilled workers	—	21
Govt. Service (clerk, peon, etc.)	—	50
Labourers	—	12
Total	80	116

The total sample consisted of 196 students of ages 9 and 10, studying in Class IV. Table 2 shows the distribution of the sample by sex, type of school and mean age.

TABLE 2

Distribution of the Sample by Sex and Type of School

	BOYS		GIRLS		TOTAL	
School	*N*	*Mean Age*	*N*	*Mean Age*	*N*	*Mean Age*
High-Fee School (HFS)	53	9 yr., 4 mth.	27	9 yr., 5 mth.	80	9 yr., 4 mth.
Free School (FS)	55	9 yr., 9 mth.	61	10 yr., 2 mth.	116	9 yr., 11mth.

Procedure

The junior author personally administered the CMAS in all the schools. In high-fee schools (HFS) where the medium of instruction was English and where the children had different mother tongues, the original CMAS in English was used. In free schools (FS) the Hindi version was administred. The administration was done exactly according to standard instructions for the CMAS. Copies of the 53 items (42 Anxiety, 11 Lie) were given to all children. The administrator explained the instructions and read all the items aloud, pausing after each item to enable the children to encircle 'Yes' or 'No' in response to each item.

Results

Scores were obtained for each *S* both for the Anxiety and the Lie scale. Means and standard deviations for anxiety and lie scores were calculated. Table 3 gives the descriptive statistics for boys, girls, and the group as a whole, for HFS and FS schools separately.

Separate two-way analysis of variance (sex school) was computed for the Anxiety and Lie scales. The principal results of these analysis were as follows,

TABLE 3

Means and Standard Deviations for Anxiety and Lie Scales in High-Fee and Free Schools

	ANXIETY SCALE			LIE SCALE	
	N	*Mean*	*SD*	*Mean*	*SD*
HFS					
Boys	53	17.70	5.92	6.91	1.88
Girls	27	22.78	4.62	5.63	3.38
Total	80	19.41	6.03	6.47	2.58
FS					
Boys	55	24.87	5.53	7.85	1.39
Girls	161	18.82	5.36	7.54	1.40
Total	116	21.67	6.29	7.69	1.39

TABLE 4

t—Ratios Comparing Indian Children with Children from Japan, U.S.A. and France for Anxiety and Lie Scores

India		*Japan*	*U.S.A.*	*France*
ANXIETY SCORE				
	B	1.69	1.77	1.02
HFS	G	4.49††	.65	.51
	B	7.74††	4.03††	5.67††
FS	G	2.02†	3.97††	3.43††
LIE SCORE				
	B	17.28††	6.47††	5.75††
	G	8.94††	3.67††	3.47††

† at 5% level of significance
†† at 1% level of significance

1. Differences in the Anxiety scores between schools and sexes were highly significant (F=57.31; P=.01 and F=52.25; P=.01, respectively). By contrast there were no significant differences in Lie scores between the schools or sexes.
2. Girls showed significantly more anxiety than boys in the HFS whereas the reverse was true in FS (each P=.01).
3. *Relation between Anxiety and Lie Scales.* An observed Pearson's 'r' of -.01 between the Anxiety and Lie scores

suggests that anxiety responses for this sample are not contaminated by social desirability.

4. *Cross-cultural Comparison.* A series of t-ratios were computed, comparing the Indian sample with Japanese, French and U.S.A. groups separately for both boys and girls. These analyses were done separately by type of schooll for Anxiety scores but not for Lie scores since the latter did not involve school differences. Table 4 gives the t-ratios for Anxiety and Lie scales, comparing Indian childern with the Japanese, American and French children, respectively.

The salient results that emerged are:

1. The mean Lie scores of Indian children, for both boys and girls, were significantly higher than those of Japanese, French and U.S.A. children (P=01).
2. The mean Anxiety scores of Indian boys from HFS did not significantly differ from those of Japanese, French or U.S.A. boys.
3. The Anxiety scores of girls from HFS were significantly higher than those of Japanese girls (P=.01) but not significantly different from those of U.S.A. and French girls.
4. The mean Anxiety scores of boys from FS were significantly higher than those of U.S.A., French and Japanese boys (P=.01).
5. The Mean Anxiety scores of FS girls were significantly higher than those of Japanese (P=.05), and significantly lower than those of U.S.A., and French girls (p=.01).

Discussion

That Indian girls in HFS are significantly more anxious than the boys is in line with the evidence obtained in the earlier investigations on samples from other cultures. (Castaneda, *et al,* 1956; Cowen and Danset, 1962; Cowen *et al,* 1963; Palermo, 1959). The results also show that: (1) Indian boys in HFS do not significantly differ in their anxiety scores from French, U.S.A., and Japanese boys; (2) Although Indian girls from HFS also do not differ significantly from American or French girls they have significantly higher mean anxiety score than do Japanese girls. Essentially then, both HFS girls and boys are very much like their Western counterparts with respect to measured anxiety level. This is in line with the investigation of Sinha (1963) who found no differences in anxiety scores of Indian and U.S.A., college youth. Sinha however cautioned that his sample, like the present one, was very selective rather than representative of the general Indian population.

The lower SES Indian sample however responded quite differently in that FS boys were found to be significantly more anxious than FS girls; moreover the Anxiety scores of Indian FS boys were significantly higher than those of U.S.A., French and Japanese boys. Indian FS girls had higher Anxiety scores than did Japanese girls, but significantly lower scores than American and French girls. A possible explanation for these directional anxiety differences for the two sexes in the two samples may be that while the HFS children are very much like the Western sample studied earlier, the low SES group are subject to different stresses and strains and hold different values and attitudes. The boys of the lower strata in India, particularly the lower middle class, face a number of special stresses and strains. For example, as a result of various programmes started after Indian Independence the awareness of the lower middle class has increased considerably. Their ambitions and aspirations have changed; their desire and work for a higher standard of living and push their boys harder to make them improve their lot. As a result, the FS boys face high parental expectation, competitiveness and need to excel, and as such are likely to be more anxious. For instance, 'worrying about doing well in school', 'others doing things in an easier way', 'other children being happier than I', are found to be their major anxieties in order of frequency.

Lower middle class girls at this age are comparatively free from the stresses that the boys are experiencing. Attitudes towards the girls have not changed much recently. Though they are sent to school, the parents do not have as high a set of expectations for them as they do for boys. Girls are thus likely to be pushed less, and therefore they experience less anxiety. Raina's (1969) study on

Rajasthan children of middle SES however revealed no sex differances in anxiety scores, but Raina did report higher anxiety scores for his sample than that reported by Cattell.

Thus rising parental demands coupled with environmental deprivations are likely to cause higher anxiety in the FS boys. For FS girls the traditional child-rearing practice with its accent on fatalism, bowing to the inevitable, reconciling to one's lot, remain in sway. Compared to FS boys, FS girls receive very little attention from the beginning and are not expected to contribute much towards the improvement of the home. As such their life is perhaps less demanding than that of the boys, and less anxiety-provoking.

While these arguments are admittedly speculative, they point to the need for further studies to probe into the nature and sources of anxiety not only across cultures but also within the culture.

The present results support to a certain extent Cattell and Scheier's view (1961) that high anxiety is associated with cultural deprivation, but do not agree with it totally. Cultural deprivation alone does not seem to cause high anxiety. Were that the case, the FS girls should have shown more anxiety than the HFS girls.

Conclusions

1. Anxiety Scale differences between the schools and between sexes were found to be highly significant, whereas such differences were not found for the Lie Scale.
2. Correlation between Anxiety and Lie scores was negligible.
3. HFS girls (higher SES) were found to have significantly higher Anxiety score than FHS boys, whereas FS boys (low SES) showed significantly higher Anxiety score than did the FS girls.
4. Mean Lie scores for Indian children were significantly higher than the mean Lie scores of the children from U.S.A., France and Japan.
5. The mean Anxiety score of Indian HFS boys did not differ significantly from the mean Anxiety scores of the Japanese, French and U.S.A. boys.
6. The mean Anxiety score of Indian HFS girls did not signi-

ficantly differ from those of French or U.S.A. girls but was significantly higher than that of Japanese girls.

7. The mean Anxiety score of the Indian FS boys was significantly higher than those of U.S.A., French and Japanese boys.

8. The mean Anxiety score of Indian FS girls was significantly higher than that of Japanese but was significantly lower than those of U.S.A. and French girls.

REFERENCES

Castaneda, A., McCandless, B. R., and Palermo, D. S. The children's form of the manifest anxiety scale. *Child Development,* 1956, 27, 317-326.

Cattell, R. B. *The Scientific Analysis of Personality.* Baltimore: Penguin Books, 1965.

Cattell, R. B., and Scheier, I. H. *The Meaning and Measurement of Neuroticism and Anxiety.* New York: Ronald Press, 1961.

Cowen, E. L., and Danset, A. Etude comparee des reponses d'ecoliers francais et americians a une echelle d'anxiete. *Revue de Psychologie Applique,* 1962, 12, 263-274.

Cowen, E.L., Izzo, L.D., Miles; H., Telschow, E. F., Trost; M.A., and Zax; M. A preventive mental health program in the school setting: description and evaluation. *J. Psychol.,* 1963, 56, 307-356.

Hafner, Jack, A. and Kaplan, Arthur M. An item analysis of children's manifest anxiety scale. *Child Development,* 1959 (b), 30, 481-488.

Iwawaki, S., Sumida K., Okuno. S. and Cowen E.L. Manifest anxiety in Japanese, French and United States children. *Child Development,* 1967, 38, 3, 713-722.

Morgan, F., Smith, B. Sutton and Rosenberg B.C. Age changes in the relation between anxiety and achievement. *Child Development,* 1960, 31, 515-519.

Ohmura, M., and Sawa, H. Taylor's anxiety scale in Japan. *Psychologia,* 1957, 1, 123-126.

Palermo, D.S. Racial comparisons and additional normative data on the children's manifest anxiety scale. *Child Development,* 1959, 30, 53-57.

Raina, T.N. An exploratory study of children's manifest anxiety scale (CMAS) on Indian children. *Ind. J. Exp. Psychol.,* 1969, 2, Vol. 3, 44-49.

Rie, H.E. An exploratory study of the CMAS lie scale. *Child Development*, 1963, 34, 1003-1007.

Sarnoff, I., Lighthall, F., Waite, R., Davidson, K. and Sarason S. A cross-cultural study of anxiety among American and English school children *J. Educl. Psychol.*, 1958, 49, 129-136.

Sarnoff, I., Lighthall F., Waite, R. Dividson, K. and Sarason S. Test anxiety and the 'eleven plus' examination. *Brit. J. Educt. Psychol.*, 1959, 29, 9-16.

Sinha, D. Manifest anxiety on an Indian sample. *J. General Psychol.* 1963, 69, 216-265.

Taylor, Janet A. A personality sacle of manifest anxiety. *J. Abnorm.* Soc. Psychol., 1953, 48, 285-290.

Tsujioka, B., and Cattell, R.B. A cross-cultural comparison of second stratum (questionnaire) personality factor structures—anxiety and extraversion—in America and Japan. *J. Psychol.*, 1965, 61, 205-219.

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Draw-a-Man Test Scores of British and non-British Children

Maya Sinha

In this study the DAM and DAW scores of 102 British and 41 non-British boys and girls aged 7-9 years, have been compared in terms of mean scores and item scores. Significant differences have been found in both these scores, between the two groups and within each group. The author interprets these differences and suggests further research.

The psychologist interested in a cross-cultural testing programme has to face the very difficult task of searching a suitable test with elements common to different cultures. Goodenough (1926) had selected the drawing of 'a man' as her test-problem thinking that between different cultures there could be no other thing of more common experience than the human figure. Every child comes in contact with human beings the moment it is born, and the contact continues throughout its life. Hence, she supposed, there was no question of one child being advantaged and the others being disadvantaged.

But investigators who compared children from different cultural groups found them scoring differently on this test. Later, Goodenough (1950) also changed her stand and said that the search for a culture-free test was illusory. Harris (1963) holds that the scale should be re-standardized for every group having distinctly different patterns of dress, mode of living, and quality or level of academic education.

However, when a researcher has to choose a non-verbal test for testing two cultural groups at a time, one of which comes from an underdeveloped and unmodernised background, and has no previous experience of taking a psychological test, the Draw-a-Man seems to have advantage over the other tests in the sense that its content is not unfamiliar to any group. It has one more point in its favour: it needs very little use of language while giving instruction to the testees.

SAMPLE

With everyday increase in the number of immigrants in certain parts of England, such as London, Birmingham, Manchester, and Liverpool, the proportions of immigrant children in different schools have increased tremendously. Most of them, particularly from India and Pakistan, go to these schools with entirely different previous school experiences, if any. A large section of such children, whose parents are uneducated and have migrated to U.K., to take up jobs as labourers in different industries, cannot speak English. For carrying out an investigation in such schools the writer decided to use the Draw-a-Man Test as a measure of general mental ability.

The Harris-Goodenough Test was applied, along with some tests of school attainment, such as tests of reading, spelling and arithmetic, in four London schools having considerable numbers of immigrant children.[1] These schools being situated in Southall, a part of Greater London, accommodate a large number of Indian and Pakistani children, mostly Punjabis. Out of a total number of 143 children tested, 41 were Indians and Pakistanis, which is equal to 28.7 per cent of the sample. From the dates of their admission it has been inferred that most of these immigrants arrived in England between 1964 and 1965. Only 4 out of 41 studied in British schools from 1962 or earlier. As the period of test administration fell between March and April 1966, the length of their schooling (in British schools) varied roughly from one to two years. Thus, the two groups of children, British and non-British, though they lived in the same locality and attended the same schools, were different from each other with regard to their school experiences and cultural background.

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[1] This testing was carried out in connection with the author's doctoral research project, but because of a later change in the project the scores were not utilized.

In the present analysis a comparison between the DAM and DAW scores of these children has been made to see the nature and extent of differences between two cultural groups.

DATA

The table below gives the number of boys and girls *at each age-level.*

TABLE 1

GROUPS	*British : N=102*		*Non-British : N=41*	
AGE/SEX	*Boys*	*Girls*	*Boys*	*Girls*
9+	23	23	10	9
8+	28	26	7	11
7+	1	1	2	2
Total	52	50	19	22

TABLE 2

Means, SDs, and Significance of Differences between Means

Scales	*Group Mean*	*British : N=102 8.43 Years*	*Non-British : N=41 8.37 Years*	*Differences and their Significance Level*
Man	M	33.30	28.20	5.10; above .01
	SD	9.30	7.50	—
Woman	M	34.70	29.90	4.80; above .01
	SD	9.10	10.50	—

Comparison between the two percentages of success in different items was also made. In 18 of the Man Scale items, and 14 of the Woman Scale items the percentages of success were a little higher for the non-British children. But the differences were small and statistically insignificant. On the other hand, the British children had exceeded the non-British children in approximately 75 per cent of the Man Scale items, and 80 per cent of the Woman Scale items. However, the differences were significant only in case of the items given in Table 3 below.

TABLE 3

Items in which British Children Scored Significantly Higher

MAN SCALE		WOMAN SCALE	
Item No.	*Details*	*Item No.*	*Details*
6	Eye-pupil	5	Eye—brow or lashes
26	Correct number of fingers	14	Lips in two dimensions
28	Hands	26	Arm—activity
29	Wrist or ankle	28	Fingers present
36	Hip I	34	Hip
51	Arm-Trunk proportion	42	Attachment of Limbs
52	Tapering of arms	48	Waist I
56	Clothing II	49	Waist II
57	Clothing III	51	No transparencies
58	Clothing IV	52	Garb—feminine
59	Clothing V	53	Garb—complete
70	Sketching Technique	54	Garb—definite type
72	Arm Movement	58	Head—trunk proportion
		62	Dress—area

Among these items, Nos. 56, 57, 58 and 59 in the Man Scale, and 48, 49, 51, 52, 53, 54 and 62 in the Woman Scale directly deal with some aspects of the dress worn by the 'human figures'. 'Wrist' or 'ankle' in Man, and 'Hip' in Woman drawings are scored with reference to the clothing depicted. Hence, there are five items in the Man Scale and eight items in the Woman Scale which deal with dress style, clothing, etc., and which have contributed largely to the differences between the two groups. Differences between the dresses worn by different cultural groups are apparent, and most of the investigators who analysed the DAM score differences between different cultures have referred to cultural influences. Menzel (1935) had tested 2600 Indian children on Goodenough Draw-a-Man test, and had suggested that in view of the far scantier amount of clothing worn by Indians the clothing items needed to be scored liberally. At one place Harris also accepts that the child's drawing of certain body features is influenced by garb.

However, further comparisons were made between the two groups, keeping boys and girls separately. The table below gives the results.

TABLE 4

Means, SDs and Significance of Differences between Means

		BOYS			GIRLS		
Scales	*Gr.*	British N=52	Non-British N=19	*Difference*	British N=50	Non-British N=22	*Difference*
	Age	8.42 years	8.42 years		8.44 years	8.32 years	
Man	M.	32.50	29.05	3.45 N.S.	33.70	27.75	5.95 at .01 level
	SD	8.50	6.80	—	8.65	9.10	—
Woman	M.	33.95	27.75	6.20 at ·01 level	36.10	31.20	4.90 N.S.
	SD	9.00	8.50	—	7.85	12.00	—

Comparisons between the percentages of success in items were also made.

RESULTS

According to the differences in the mean scores the non-British children appear to be particularly handicapped in drawing the opposite sex. An explanation only in terms of lack of information on

TABLE 5

Items in which British Boys and Girls Exceeded the Non-British Boys and Girls by Significant Percentage Differences

Man Scale				Woman Scale			
Boys		Girls		Boys		Girls	
Item No.	*Details*	*Item No.*	*Details*	*Item No.*	*Details*	*Item No.*	*Details*
6	Eye-Pupils	28	Hand	48	Waist I	28	Fingers Present
25	Correct number of fingers	29	Wrist or ankle	52	Garb—feminine	34	Hip
28	Hand	36	Hip I	53	Garb—complete	42	Attachment of limbs
36	Hip I	51	Arm-proportion I	54	Garb-definite type	44	Sleeve I
						48	Wasti I
		53	Leg-proportions	57	Head-trunk proportion	53	Garb-complete
		57	Clothing III			62	Dress area
		70	Sketching technique				
		72	Arm-Movement				

the part of these boys and girls regarding the Western style clothing of the opposite sex is not tenable, because all the items on which they performed badly are not clothing items. The Man Scale items especially, in which British boys and girls exceeded the non-British boys and girls, respectively, are not related to dress style and clothing, with two exceptions in the girls' groups.

In the Woman Scale, however, the items with significant difference in percentages of success are mostly clothing items.

As to the number of items, in which the two groups differed significantly, they are larger in the case of the opposite-sex drawings. But, the girls differed in a larger number of items in both the scales, although the difference in the Woman Scale mean score of the two groups was not significant.

DISCUSSION

In general, the items of larger percentage differences are related to dress style and clothing in the Woman Scale, and to some universal features of a human figure in case of the Man Scale. It appears that the extent to which the men and women in these Eastern countries have adpoted the Western style dress is reflected in this differential picture. While a sufficiently large percentage of Indian and Pakistani men (partcularly in the urban areas) wear Western style dresses such as trousers, shirts, etc., the womenfolk have not adopted the Western style at all. Thus, the differences in the clothing items of the female figure are large.

Significant percentage differences in the Man Scale on universal features such as 'Pupils' and 'Hand', and items dealing with 'Proportion', 'Sketching technique', and 'Movement' seem to have resulted from the differences in the type of education, specially art education. In Western schools children are encouraged to express themselves through drawings and paintings. By way of everyday classwork they get ample opportunity to draw what they like. As human figure drawing is, naturally, interesting to children, they must have drawn human figures many times before they took the test, and hence their performance on items of 'details' and 'proportions' is superior.

CONCLUSIONS

The test in its present form consists of two scales. Some new facts have emerged as a result of comparison between the two scores of the two sexes in different cultural samples. These are given below.

1. Significantly low mean scores have been obtained by the non-British boys on the DAW, and the non-British girls on the DAM. They do not differ significantly from the boys and girls of the other group, respectively, on the drawing of their own sex. This trend is present even in the Woman Scale which is said to be more 'culture bound'. Thus it seems that the opposite-sex scores of the non-British children are affected by some sort of emotional involvement.

2. Within one cultural group, both the boys and girls of the British sample have scored higher on the DAW than on the DAM But among the non-British children boys have a lower DAW mean score than their DAM mean score, and the girls have a lower DAM mean score than their DAW mean score. In Harris' (1963) American sample, boys in each age-group, up to the age of 10 years, scored a little higher on the Woman Scale. After that their scores on the Woman Scale, at each age-level up to the age of 15 years, were lower than their scores on the Man Scale. The girls, however, had higher DAW mean scores at all the ages from 5 to 15 years. In the writer's (Maya Sinha, 1969) study of over five hundred British children, aged 7 to 10 years, the boys at each age-level had earned a little lower DAW mean score than the DAM mean score. The girls, again, had scored higher on the Draw-a-Woman scale than on the Draw-a-Man scale. Thus, the boys of all the four groups (Harris' normative sample; Sinha's 1969 sample, the two groups of the present study) have scored differently on the two scales. There is also a difference between Harris' 5-10 year old boys and 11-15 year old boys. On the other hand, the girls' trend is stable from group to group.

This differential pattern of differences between two scores of the boys and girls with different backgrounds, suggests that besides the intellectual factors, some personality factors also get involved in drawing 'a man' and 'a woman'.

Futher researches in this direction are needed to discover the relationship between these scores and some measures of personality.

REFERENCES

Goodenough, F.L. *Measurement of Intelligence* by Drawings. New York: Hartcourt Brace and World, 1926.

Goodenough, F.L., and Harris, D.B. Studies in the Psychology of Children's Drawings—II, 1928-1949. *Psychol. Bull.,* 1950- 369-433.

Harris, D.B. *Children's Drawings as Measures of Intellectual Maturity* Hartcourt Brace and World, Inc., 1963.

Mensel, E.W. The Goodenough Intelligence Test in India. *J. App. Psychol.,* Vol. 19, 1935, pp. 615-624.

Maya Sinha. A Study of the Harris-Revision of the Goodenough Draw-a-Man Test. Ph.D. Thesis, London University, 1969.

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Traditional Teaching and Open-Book Examinations in Social Studies

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The authors have attempted to study the practicability and advantages of open-book examinations in social studies at Class VIII level, as compared to the traditional type examinations, in the Indian school setting. They have also compared the effects of two different methods of teaching, followed by these two types of examinations, on high achievers, average achievers and low achievers. They find among other things that open-book examinations greatly reduce cheating and the use of unfair means, and are better for the low and average achievers taught through the traditional method.

Those who support the essay-type closed-book examinations which form the backbone of the evaluation machinery in India today, emphasize their capacity to measure "a student's ability to organise, integrate and synthesize knowledge; to use his information to solve novel problems and to be original or innovative in his approach to problem situations". (Thorndike and Hagen, 1969.) To what extent the typical essay-type questions in our examinations assess the above qualities is debatable and may form the subject-matter of an-

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other enquiry but it has been pointed out that in such examinations differences in knowledge of basic factual material greatly affect the evaluation of pupils on the basis of above qualities. The so-called open-book examinations are said to be advantageous in the sense that every examinee is given full freedom to consult and take help from any source of information in the form of books, notes, keys, etc., pertaining to the particular questions. The rationale behind this is to iron out differences in basic factual knowledge so that examinees can be evaluated on the salient features outlined above (Ebel, 1965). Another advantage in open-book examinations is that these are said to motivate students to apply their knowledge rather than 'vomit facts out' in the examination hall after committing them to memory. Lastly, as is borne out by the studies of Tussing (1951), Kalish (1958) and Fieldhusen (1961), 'cheating' is eliminated in such examinations.

A move to introduce open-book examinations at various board and university levels in India is very much in the air these days. Ironically, this type of examination has been proposed by educationists with faith in the traditional examinations, at a time when large-scale cheating and use of unfair means during examinations everywhere have already rendered the traditional tests into more or less the 'open-book' type thus undermining the very sanctity and validity of prestigious examinations. Nevertheless, when one such proposal was announced by the University of Jodhpur, in early 1970, various other centres of learning showed keen interest in open-book examinations. Punjab even introduced such examinations at middle school stage and also initiated a pilot project but it was soon shelved without cogent reasons. Very recently (*Link*, 1971), a seminar of examination experts was organized by the Inter-University Board of India and Ceylon to consider ways of making our examination system "more efficient, more reliable and a better test of students' real ability." The seminar dealt at length with the question of introducing wholesale reforms in the existing system in the light of "mass copying", thereby focussing attention once again on the introduction of open-book examinations in the Indian educational setting.

The present investigation, though very limited in scope, is nevertheless significant in ways more than one. Not only it is the first of its kind in India where open-book examinations have been looked down upon so far, but also, an effort has been made to study the effect of such examinations in the context of different methods of teaching a particular subject (social studies). Besides this, the effects of different examinations administered after different methods of teaching have been studied on students with high, average and low achievement records in the subject concerned. In fact it is a study of the interaction between the three levels of achievement, two methods of teaching social studies, and four different types of examinations, knowledge about which is of vital theoretical importance before any reforms in pupil evaluation are put into practice, at least in this subject!

The specific objectives of the present investigation were to elicit answers to the following questions:

1. Are open-book examinations a practical proposition in the Indian educational setting?
2. Are open-book examinations better than the traditional closed-book type examinations, both in administration and scoring?
3. Is it possible to modify the traditional tests and the open-book examinations still further by adding *viva voce* tests to them so as to assess in a better manner the pupils' real ability and understanding?
4. Is it necessary to change the method of teaching a particular subject to ensure better results with the open-book examination, or is traditional teaching adequate for such examinations?
5. Which is the better method of teaching social studies—the traditional method emphasizing facts and their memorization or the new method, emphasizing the concepts underlying the subject-matter and their application?
6. Who are the gainers and the losers in open-book examinations—the high achievers, the average achievers or the low achievers?

Social studies was specially selected as the subject for investigation because parents, teachers and students have generally formed the wrong opinion that it merely consists of memorization of facts, dates and events and that social studies does not contribute much in the development of proper attitudes and training of mind. This fact was confirmed by a glance at the achievement of the said class in social studies. The class had a maximum number of low achievers. Further, it was reported by the school authorities that in the social studies examination, more cases of cheating were noticed.

The investigators divided the entire group of 120 students into two groups of 60 each on the basis of the Matched Group technique. Each sub-group consisted of 60 students which in turn had six as high achievers (B_1), 24 as average achievers (B_2), and 30 as low achievers (B_3).

Controls Applied

Controls were exercised with respect to the following variables:

1. *Age of the students.* The mean age of both the groups was 13 years, 6 months.
2. *Health of the students.* The students comprising the two groups were apparently in sound health.
3. *Material.* The material taught was the same with respect to the nature of content and meaningfulness. It only differed with respect to the methods of presentation, being supplied to the different groups under different conditions. To one group the material was presented through the Traditional Method (A_2) and to the second group the same material was presented through the New Method (A_1).
4. *Teacher.* Two teachers having a good educational background and interest and experience in the subject were selected. One of them was asked to teach the subject through the New Method (A_1), with which he was made well acquainted by the investigators, to both the groups at various stages of the experiment.

5. *Types of examinations.* Both the groups were tested through four types of examinations:
   - (i) Traditional type of examination (C_1)
   - (ii) Tradtional type of examination plus *viva voce* (C_3)
   - (iii) New type of examination—Open-Book Examination (C_2).
   - (iv) Open-Book Examination plus *viva voce* (C_4)

   Actually only C_1 and C_2 types of examinations were conducted and the scores in *viva voce* were added to both the examinations to yield scores in C_3 and C_4 types of examinations.
6. *Motivation.* The motivational differences likely to come up between the two groups due to different methods of teaching and different types of examinations were minimized by conducting the classes and administering examinations in a very natural atmosphere without attaching any importance either to the types of examinations or methods of teaching. The teachers concerned were also briefed to this effect.
7. *Previous knowledge.* Previous knowledge of both the groups regarding social studies was the same, and the subject teachers concerned had not previously taught the subject-matter selected for the project to any one in the groups.

Independent Variables

1. Different types of examinations
2. Different methods of teaching
3. Levels of achievement.

Dependent Variable

Achievement in social studies.

Research Design

For the classification and analysis of the data collected, a 2×3×4 factorial design was devised as outlined by Lewis (1968) and Snedecor and Cochran (1967).

An outline of the design is given below:

1. Factor A—Methods of Teaching Social Studies
   A_1=New Method of Teaching
   A_2=Traditional Method of Teaching

FACTOR A

				A_1	A_2	
B_1			C_1			Number in each cell N=6
			C_2			
			C_3			
			C_4			
B_2	FACTOR B		C_1			Number in each cell N=24
			C_2			
			C_3			
			C_4			
B_3			C_1			Number in each cell N=30
			C_2			
			C_3			
			C_4			

2. Factor B—Levels of Achievement in Social Studies
   B_1=High Achievers
   B_2=Low Achievers
   B_3=Low Achievers
3. Factor C—Types of Examinations
   C_1=Traditional Type of Examination (Closed-Book Essay Type)
   C_2=Traditional Type of Examination+*Viva Voce*
   C_3=New Type of Examination (Open-Book Examination)
   C_4=New Type of Examination+*Viva Voce*

PROCEDURE

The teacher who had to present the subject-matter through New Method (A_1) was briefed in detail regarding the important concepts underlying the subject-matter in the light of main objectives of teaching social studies which had been identified after giving them due weightage. Broader concepts were identified on the lines laid by the NCERT (Desai and Mehta, 1961; DCMT, 1965), and are given below:

1. Familiarity with historical facts.
2. Development of historical consciousness.
3. Telescoping past with present, i.e., to create an idea of the oneness of history.
4. To change attitudes in the light of the present situation, i.e., to inculcate national feelings.
5. To give a picture of the changing society from time to time, i.e., social changes, the various forces that have effected society from time to time.
6. To develop critical and evaluative faculties.
7. Important incidents or happenings that had far reaching effects or results.
8. Comparative study of places, people and incidents.

Next, both the teachers were instructed that students should not be made conscious that something special was being carried out.

They were further instructed to announce in their respective classes that at the end of the month they would be tested through the Traditional Type of Examination (C_1) and the Open-Book Examination (C_2), and then examined through *viva voce*. They were informed that all the marks achieved would be added up for their annual result.

After this, a particular piece of subject-matter was presented to one group through the Traditional Method (A_2); and to the other group the same learning material was presented through the New Method (A_1). The duration of the course for both the classes was one month. At the end of one month both the classes were examined through three types of examinations, *viz.*, Traditional Type (C_1), Open-Book Type (C_2), and *Viva Voce.*

The question paper for the open-book type examination was set according to the blueprint, and weightage given to different units of subject-matter in the light of the broader concepts described earlier.

Both the groups were tested on the same day. The group taught during the month through Traditional Method (A_2) was in the first meeting examined through Traditional Essay-Type question paper (C_1) and then through Open-Book Examination (C_2) during the second meeting on the same day, followed by *viva voce*. The group taught through New Method (A_1) was in the first meeting examined by New Type Examination (C_2) and then in the second meeting on the same day through Traditional Examination (C_1) followed by *viva voce*. The duration of time for each written type of examination was an hour and a half.

The two different groups were examined in two different rooms under strict supervision, minimizing the chances of interaction among students. Before the start of the examination the students were formally instructed to do their work honestly. However, the teachers concerned were instructed to note down in confidence the number of times students tried to cheat without giving any impression whatsoever to the student concerned that he was being observed or taken notice of.

Between the two meetings, the two different groups were not allowed to mix. They were given a rest for two hours, but in separate halls, thereby totally minimizing the passibility of interaction among the students of two different groups which would otherwise reduce reliability. No books were permitted with them during this period. After both the groups had taken two written examinations they were subjected to a *viva voce* examination.

For conducting the *viva voce* examination, the investigators had framed a schedule in which questions were framed essentially on the basis of the blueprint in order to ascertain organization, application and understanding of the praticular subject-matter besides the knowledge of facts. For reducing subjectivity in scoring on the part of the interviewers conducting the *viva voce,* a panel of three interviewers was appointed. The panel consisted of the two teachers concerned and one investigator. Finally, the mean of their ratings was taken as the score for a particular examinee.

The scoring of the answer papers was done by the subject teachers concerned. The teacher who taught through New Method (A^1) was briefed particularly to lay emphasis while marking on the main objectives of teaching that particular subject-matter round which he had geared his teaching. Finally to each examinee's score that he had obtained through Traditional Type of Examination (C_1) and Open-Book Examination (C_2), his score in the *viva voce* was added to yield scores for two more types of examinations, *viz.,* Traditional Type of Examination plus *viva voce* (C_3) and Open-Book Type of Examination plus *viva voce* (C_4).

The entire procedure was rotated in the following month but new subject-matter in social studies was presented this time.

On the completion of the experiment, the students of both the groups and the teachers concerned were asked to submit their introspection reports regarding the methods of teaching and the different types of examinations, and their reactions to examination with open books. Later, interviews were arranged to gain more insight into the different aspects of the experiment.

DISCUSSION OF RESULTS

Table 1 shows the summary of the Analysis of Variance applied to the data treated as a $2 \times 3 \times 4$ factorial design outlined eaerlier

RESULTS

TABLE 1

Summary of Analysis of Variance of Data

Source of Variation	*S. S.*	*df*	*Mean Square Variance*	*F-ratio*
Methods of Teaching (A)	421.860	1	421.860	3.10
Levels of Achievement (B)	35816.550	2	17908.275	131.50**
Types of Examination	1849.350	3	616.450	4.53**
Methods of Teaching × Level of Achievement (A×B)	567.34	2	283.670	2.08
Methods of Teaching × Types of Examination (A×C)	3860.460	3	1286.820	9.45**
Levels of Achievement × Types of Examination (B×C)	3214.910	6	535.818	3.93**
Methods of Teaching × Levels of Achievement × Types of Examination (A×B×C)	763.000	6	127.167	.93
Within cells	62096.83	456	136.177	

**Singinficant at .01 level

TABLE 2 A

Interaction between Methods of Teaching and Types of Examination (A×C)

	A_1	A_2
C_1	M=43.48* N=60	M=35.57 N=60
C_2	M=45.95 N=60	M=38.80 N=60
C_3	M=34.75 N=60	M=38.93 N=60
C_4	M=38.25 N=60	M=41.63 N=60

* Each cell represents the Mean Score in achievement for the group.

TABLE 2 B

Significance of Difference between Various Cell Means in Table 2 (a) by Computation of 'C' ratios

Group under Reference	*Observed Difference between Means*
A_1C_1 and A_2C_1	7.91**
A_1C_2 and A_2C_2	7.15**
A_1C_3 and A_2C_3	4.18*
A_1C_4 and A_2C_4	3.38
A_1C_1 and A_1C_2	2.47
A_1C_1 and A_1C_3	8.74**
A_1C_1 and A_1C_4	5.23*
A_1C_2 and A_1C_3	11.20*
A_1C_2 and A_1C_4	7.70*
A_1C_3 and A_1C_4	3.50
A_2C_1 and A_2C_2	3.23
A_2C_1 and A_2C_3	3.36
A_2C_1 and A_2C_4	6.06*
A_2C_2 and A_2C_3	0.13
A_2C_2 and A_2C_4	2.83
A_2C_3 and A_2C_4	2.70

* Significant at .05 level
** Significant at .01 level

TABLE 3 A

Interaction between Levels of Achievement and Types of Examination

B

		B_1	B_2	B_3
C	C_1	M=68.00 N=12	M=43.46 N=48	M=30.68 N=60
	C_2	M=70.33 N=12	M=46.35 N=48	M=33.60 N=60
	C_3	M=53.16 N=12	M=37.69 N=48	M=32.90 N=60
	C_4	M=57.25 N=12	M=41.33 N=48	M=35.37 N=60

TABLE 3 B

Significance of Difference between Various Cell Means in Table 3 (a) by Computation of t-ratios

Groups under Reference	*Observed Difference between Means*
B_1C_1 and B_1C_2	2.33
B_1C_1 and B_1C_3	14.84**
B_1C_1 and B_1C_4	10.75**
B_1C_1 and B_1C_3	17.17**
B_1C_2 and B_1C_4	13.08**
B_1C_3 and B_1C_4	4.09
B_2C_1 and B_2C_2	2.89
B_2C_1 and B_2C_3	5.77*
B_2C_1 and B_2C_4	2.03
B_2C_2 and B_2C_3	8.66**
B_2C_2 and B_2C_4	5.02 (x)
B_2C_3 and B_2C_4	3.64
B_3C_1 and B_3C_2	2.92
B_3C_1 and B_3C_3	2.22
B_3C_1 and B_3C_4	4.69 (x)
B_3C_2 and B_3C_3	.70
B_3C_2 and B_3C_4	1.77
B_3C_3 and B_3C_4	2.47

* Significant at .05 level
** Significant at .01 level
(x) Insiginificant but conspicuous

TABLE 4

Incidence of Cheating on two Occasions in the Two Forms of Examinations (C_2 & C_3)

	Occasion 1	Occasion 2
Traditional Test C_1	151	172
Open-Book Examination C_3	19	11

The total variance has been duly partitioned so as to denote variance due to the main effects, namely, the Methods of Teaching (A), Levels of Achievement (B), and Types of Examinations (C). Besides this, variances contributed by the interaction of any two effects at a time (first-order interactions, *viz.*, A×B, A×C and B×C) and due to all the effects (second-order interaction A×B×C) have been isolated. It can be seen that out of three main effects, two—namely, levels of achievement (B) and types of examination (C)—are significant at .01 level. Out of the three first-order interactions, two, (A×C) and (B×C), are significant at .01 level. In other words, Methods of Teaching and Types of Examination, on the one hand, and Levels of Achievement and Types of Examination, on the other, significantly affect each other. The second-order interaction (A×B×C) however, is insignificant.

The two significant interactions of the first order (A×C and B×C) were analysed separately at length by taking the Mean Scores for all the cross classifications. T-ratios were worked out between various cell means for each interaction and these have been represented in Table 2 and Table 3, respectively. Out of 16 such differences in Table 2, two are significant at .05 level, six are significant at .01 level, while 8 are insignificant. In the case of (B×C) interaction analysed in Table 3, out of 18 t-ratios, one is significant at .05 level, while five are significant at .01 level. The remaining 12 are insignificant but out of these two cannot be ignored as they very nearly reach the value required at .05 level of significance.

Table 4 depicts the total incidence of cheating recorded by the teachers supervising the two types of examinations on both the occasions. It can be seen that the incidence is considerably higher in the traditional test than in the examination with open books, which suggests that the latter may be a good substitute for the former. In fact, the incidence of cheating actually decreased on the second occasion in case of the open-book examinaiton.

The introspection reports obtained form examinees revealed that they would like to continue with examinations with open books in social studies because of less examination tension or worry and the increased confidence which books and helping notes instilled among them. The students were able to point out that cheating had been drastically minimized in such examinations but that the question paper was 'difficult' in the sense that books were not of much help. Further, the *viva voce* following such tests did expose each student and they were afraid of it. A few students also remarked that greater effort was needed to prepare adequate notes and understand the subject-matter than for just committing the same to memory for traditional tests. By and large, except the students identified as high achievers, both the average and the low achievers were greatly satisfied with their performance which did improve a little. The teacher engaged in teaching the subject by the new method pointed out that he had to put in a lot more labour to achieve some of the objectives laid down in the blueprint but he found boys and girls more responsive and motivated to cross the boundary of the textbook and that they even consulted him on various occasions outside the classroom for some clarification and discussion However, the teachers who supervised the conducting of the open-book examinations agreed unanimously that it was easier to administer and score because mistakes in basic facts were fewer. The blueprint was considered an essential aid, not only in teaching but also in scoring answer-books.

CONCLUSIONS

The following conclusions emerge from the present investigation:

1. Open-book examinations were found to be easier to administer and score than the traditional examinations. They are, therefore, a practical proposition in the Indian educational setting and are recommended for wider use, in social studies at least, at Class VIII level.
2. It is possible to modify the traditional examinations and the open-book examinations in an effort to measure a pupil's real ability. In the present study, *viva voce* tests in social studies conducted by a group of three teachers provided adequate modification to both the types of examinations.
3. Open-book examinations in social studies were found to be a very effective cure for cheating and the use of unfair means in the examination hall.
4. Greater worries and tensions were associated by students

with traditional examinations and *viva voce* than with open-book examinations.

5. The new method of teaching social studies (A_1) followed by a traditional test (C_1) gave significantly better results than the traditional method of teaching social studies (A_2) followed by traditional test (C_1). Similarly, the new method of teaching social studies (A_1) followed by traditional tests plus *viva voce* (C_2) was found to be better than such tests conducted after old method (A_2) of teaching the same subject.

6. The new method of teaching social studies (A_1) followed by examinations with open books (C_3) gave decidedly better results than results obtained from such examinations given after the traditional method of teaching (A_2). However with new method of teaching social studies (A_1), traditional examinations (C_1 & C_2) showed significantly better results than both the examination with open books and the examination with open books plus *viva voce* (C_3 & C_4). Similar results were obtained in the case of traditional tests plus *viva voce* (C_2) preceded by the new method of teaching social studies (A_1) which was found to give better results than both the forms of open-book examinations (C_3, C_4).

7. Where the traditional method of teaching social studies (A_2) had been followed, examinations with open-books plus *viva voce* (C_4) gave significantly better results than the traditional examinations (C_1 & C_2).

8. The high achievers in the present investigation (B_1) identified with the help of performance on traditional social studies tests showed a tendency to score higher in the traditional tests (C_1 & C_2) than in the new types of examinations (C_3 & C_4).

9. The mean level of achievement of average achievers (B_2) in social studies showed a tendency to be higher in examinations with open books (C_3 & C_4) than their achievement in traditional examination (C_1 & C_2).

10. Low achievers showed a tendency to score higher in the subject in examinations with open books (C_3 & C_4) than through traditional examinations (C_1 & C_2).

11. Since the examinations with open books (and such examinations followed by *viva voce*) were found to be conducive to better

performance in the case of average and the low achievers being taught by traditional method of teaching social studies, the use of such form of tests in the subject concerned may be recommended at eighth grade level.

REFERENCES AND BIBLIOGRAPHY

Desai, D.M. and Mehta, T.S. *Evaluation in Social Studies.* Directorate of Extension Programmes for Secondary Education, Ministry of Education, Govt. of India, 1961.

Ebel, R.L. *Measuring Educational Achievement.* Englewood Cliffs, N.J.· Prentice Hall Inc., 1965.

Fieldusen, J.F. An Evaluation of College Students Reactions to Open-Book Examinations. *Edulc.* & *Psychol. Measurement,* 21: 637-646, 1961.

Kalish, Richard A. An Experimental Evaluation of the Open Book Examination. *J. Educl. Psychol.,* XLIX, 200-204, 1958.

Lewis, D.G *Experimental Design in Education.* London: University of London Press Ltd., 1968.

Sharma, P.D. *Improving Examinitaons.* (Evaluation & Examination, Series-2). New Delhi: NCERT, 1963.

Snedecor, W. and Cochran, W.G. *Statistical Methods* (Sixth edn.) 1967.

Social Studies: *A Draft*. *Syllabus for Class I sto XI.* New Delhi NCERT, 1965.

Spolight on Examination Reforms. *Link,* Vol. 13, No. 26. 7 February 1971.

Thorndike, L. and Hagen, E. *Measurement and Evaluation in Psychology and Education.* (Third edn.). New York: John Wiley and Sons Inc., 1969.

Tussing Lyle. A Consideration of the Open Book Examination. *Educl. & Psychol. Measurement,* XI, 597-602, 1951.

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Financing of Education in India : Institutional Framework, Participation and Growth

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The author describes the institutional framework and the mechanism of educational finance in India. He identifies in the financing of education during three Five-Year Plans (1950-66), the major trends in the participation of the Central government, State governments, local bodies, endowments, households, and international agencies, and analyses the educational expenditure in relation to the gross domestic product, and total State and Central expenditure on all sectors. He then evaluates the expenditure for 1965-66 as estimated by the Education Commission (1964-66) in relation to the actual educational expenditure.

At the outset, it may be pointed out that in India the financing of education is quite different from the administration and management of the educational system. The administrative structure of the educational system is broadly determined by the governmental setup. The institutional structure of the financing of education, on the

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other hand, is mostly governed by broader considerations, like society's 'paternalistic' concern for children in general (and irresponsible parents in particular), the presence of 'neighbourhood' effects in the costs and benefits of education, and the fact that education satisfies many characteristics of a merit want good and is a means for equalisation of social opportunities, etc. (Arrow, 1968, 877-8).

The administrative and other participating agencies in the financing of education are arranged below according to descending order of importance in the total scheme of financing of education:

(a) State governments;
(b) direct beneficiaries (student paying fees);
(c) Central government;
(d) municipal corporations/boards in urban areas;
(e) district boards in rural areas;
(f) religious and charitable institutions;
(g) endowments; and
(h) international agencies.

The tuition fee, paid by students as price for educational benefits, is the single 'internal' source of finance for education. The Central and State governments, the local bodies and 'the rest of the world' are the external sources of finance for education. The financial support given by households (through tuition fees), private endowments and charitable institutions is usually referred to as the 'private' source of finance. Financial support received from Central and State governments and local bodies constitutes the 'public' sources of finance.

The Ministry of Education, Government of India, publishes, after an average time lag of three years, the annual statistics of educational finance. Further, these statistics suffer from several limitations and do not permit systematic analysis of the trends in data according to sources of finance. For example, while presenting data according to sources of educational finance, against the Central government only the expenditure incurred directly by the Ministry of Education and other Ministries is shown. The expenditure out of Central grants given under the awards of Finance Commission and the developmental grants given under Five-Year Plans is shown against the State governments and not against the Central government. Similarly, the expenditure out of State grants to local bodies, spent on education, is shown against the local bodies and not against the State governments.

Besides these difficulties, the published data on expenditures do not include expenditure incurred on (a) unrecognised institutions; (b) pensions paid to retired teaching and non-teaching staff; (c) the administrative expenditure of the Central Ministry of Education and of the Departments of Education in the State governments, and of UGC and NCERT; (d) the non-tuition costs of education; and (e) the income forgone by the students. It is not possible even to guess the volume and sources of expenditure on items (a) to (e).

Before going into an analysis of the contribution made by the different sources of finance, it will be appropriate if we analyse the overall framework of the Central and State partnership in the financing of education and the role played by the Finance Commission and the Planning Commission in this context.

Centre-State Relationship

This inter-governmental relationship in educational finance has to be viewed in the over-all framework of functions and responsibilities, capacity for mobilisation of resources and the mechanism for transfer of financial resources from the Centre to the State governments. An analysis of the Seventh Schedule of the *Constitution of India* shows that there is an imbalance between the functions and responsibilities assigned to the States and the resources available with them. Rapidly growing activities like education, public health and agriculture which require close supervision and control have been put under the administrative control of State governments. On the other hand, highly elastic sources of revenue such as taxes on income (excluding agriculture) and business and customs and excise duties fall in the 'Union List'. Commenting on the demand-and-supply positions of resources of the State governments, the Fifth Finance Commission (1969) observed: "There is a chronic gap between the States' own revenues and their expenditure commitments and consequently there is persistence and growing need for larger transfer of funds to the States". (p. 8).

In order to meet the growing financial requirements of the State governments, the *Constitution of India* provides for Central assistance to State governments. Thus, under Articles 270 and 272, the Finance Commission, generally appointed for a period of five years, distributes resources with respect to certain taxes between the State and Central governments, and under Article 275 gives assistance to State governments. On the other hand, the Planning Commission, a permanent advisory and coordinating agency, gives grants to States under Article 282 of the *Constitution of India.* The general-purpose grants given by the Finance Commission are treated by the State governments as a part of their general revenues. And the assistance given under the Planning Commission recommendations has been project-specific during the First and Second Five-Year Plans; thereafter assistance has been given for the State Plan as a whole. But under the 'centrally sponsored' sectors the Plan grants are still given according to projects. Besides grants given by the two Commissions, individual ministries of the Central government also give grants to the States in their respective functional areas. Further, the Ministry of Education and Social Welfare gives full financial support to educational institutions of national importance and to higher educational institutions through the University Grants Commission, and to school improvement programmes through the National Council of Educational Research and Training.

In short the transfer of resources from the Centre to the States takes the following forms:

(a) participation in taxes;
(b) statutory grants;
(c) non-statutory and non-plan grants;
(d) plan grants; and
(e) loans.

Assistance of type (a) and (b) is given under the Finance Commission's quinquennial awards to meet the 'committed' expenditure on continuing programmes and institutions, carried forward from previous Plans. In this way educational institutions and related programmes which have been functioning for a long time are covered by the assistance given by the Finance Commission. The financial assistance for new Plan schemes in different sectors, including education, is given by the Planning Commission under (d). At the end of each Plan, the expenditure on new schemes is shifted to 'committed' non-plan expenditure and is taken care of by the assistance received under the Finance Commission's recommendations. The Central government also gives assistance to State governments under (c), and loans as mentioned in (e).

From this analysis of Central assistance, it is clear that the educational sector, where the 'committed' expenditure forms the bulk of total expenditure (as against agriculture, power and other projects, where maintenance expenditure is only a small part of the total cost), has to compete hard for resource allocations in the State budgets—and the role of Central assistance under Finance Commission's awards becomes very important in this context.

Transfer of Resources

In order to appreciate the significance of the figures presented in the Table 1, a few clarifications are in order. The expenditure in government budgets is classified into 'current account' and 'capital account'. The expenditure incurred during the accounting period of one year is put under current account, and the expenditure incurred on purchase of goods and services required for projects of longer life expectancies and generally financed by public borrowing are put under capital account. However, there is always an overlapping of items between the current and capital accounts. Items of capital nature may occur in the current account and *vice versa.* According to government classification, the entire educational expenditure is classified as current and not as capital account. If the investment view of education is taken into consideration, the educational expenditure has to be re-classified in terms of capital account and preparation of budgets for educational projects has to be undertaken on the lines similar to those of physical capital projects.

From Table 1, it is seen that the Central assistance to the State

TABLE 1

Transfer of Resources from the Centre to the States during the First, Second and Third Five-Year Plans

(In crores of Rs.)

Sl. No.	*Plan*	*Resources made available by the Centre*						*Expenditure of States*			*Percentage of*			
		Share Taxes	*Statutory grants*	*Non-Statutory Non-Plan grants*	*Plan grants*	*Loans*	*Total*	*Revenue Account*	*Capital Account*	*Total*	*Col. 7 to Col. 10*	*Col. 4+ to Col. 5 Col. 3+ Col. 4+ Col. 5*	*Col. 2+Col. 3+ Col. 4+Col. 5 to Col. 8*	*Col. 2+ Col. 3 to Col. 8*
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	First Plan (1951-56)	326	103	40	145	799	1413	2,355	997	3,382	42.15	64.24	26.07	18.22
2.	Second Plan (1956-61)	712	207	78	461	1411	2869	3,935	1,908	5,843	49.10	72.25	37.05	23.35
3.	Third Plan (1961-66)	1196	330	156	818	3100	5600	7,292	3,459	10,751	52.08	74.69	34.28	20.93
4.	All Plans (1951-61)	2234	640	274	1424	5310	9882	13,582	6,364	19,946	49.54	72.63	33.66	21.16
5.	1965-66	276	75	52	222	821	1446	1,913	942	2,855	50.65	78.51	32.67	18.35

* 1965-66 is the last year of the Third Five-Year Plan and is included in Rows 3 and 4.

Source : *The Finance Commission Report, 1969,* pp. 2 & 6-7. Also see *Combined Finance and Revenue Accounts of the Central and State Governments* for 1951-52 to 1965-66, brought out by the Comptroller and Auditor General, Government of India; and *Reserve Bank of India Bulletin,* May 1966, p. 507, published by the Reserve Bank of India.

governments has been of the order of 42.15 per cent during the First Plan, 49.10 per cent in the Second Plan, and 52.08 per cent in the Third Plan. From Col. 12 it is also noted that non-statutory non-Plan and Plan grants constitute the bulk of the total assistance. It is further noted that of the total assistance, these grants formed 64 per cent in the First Plan and about 75 per cent in the Third Plan. This shows that statutory grants have emerged as less important than the non-statutory non-Plan and Plan grants. From Col. 13, it is further noted that if we exclude loans given by the Central government to State governments, the Central assistance in relation to revenue account was of the order of a little over 26 per cent in the First Plan, and a little over 34 per cent in the Third Plan. In the total scheme of Central assistance, it is observed from Col. 14 that the Finance Commission's recommendations lead to greater transfer of resources as compared to non-statutory non-Plan grants and those given under the recommendations of the Planning Commission. However, among grants the Plan and non-statutory non-Plan grants are more important than the statutory grants. On the whole, transfer of resources through five channels forms the substantial support for the financing of governmental activities at the State level.

As mentioned earlier, it is not possible to know the magnitude of resources allocated to education, out of the total resources transferred to the States under the Finance Commission awards. But an attempt has been made to estimate the share of (a) grants-in-aid to schemes included in the State Plans, and (b) grants-in-aid to the Centrally sponsored programmes in which the Centre is directly interested which is allocated to the sector of education. From Table 2, by subtracting from figures in Col. 5 those given in Col. 4, we have estimated the size of grants-in-aid received under non-statutory, non-Plan grants in the field of education.

These grants constituted only 2.3 per cent of the total State expenditure on education under the revenue account in the First Plan, but 10.6 per cent in the Third Plan. Analysing these figures in relation to the Central budget on education, grants constituted 29.6 per cent in the First Plan and 47.2 per cent in the Third Plan. It shows that there is an upward trend in the share of Central assistance in the

TABLE 2

Central Assistance with respect to Education during the First, Second and Third Five Year Plans

(In millions of Rs.)

Sl. No.	Plan	Expenditure on Education Revenue Account			Combined Expenditure by the Centre, and States and Union Territories	Grant-in-aid Col. 5 minus Col. 4	Centrally Sponsored Sector in Education	Col. 6 as percentage of		Share of Centrally Sponsored Sector in Col. 5	Share of Centrally Assisted Sector in Col. 5
		Centre	State	Total				Col. 2	Col. 3		
	1	2	3	4	5	6	7	8	9	10	11
1.	First Plan	283·6	3945.8	4229.4	4145.5	83.9	58.0	29.58	2.26	69.73	30.87
2.	Second Plan	1487.9	7582.3	9070.2	8495.7	574.5	123.0	38.61	7.52	21·40	78.60
3.	Third Plan	3329.0	14795.6	18124.6	16553.6	1571.0	279.0	47.20	10.61	17.75	82.25
4.	All Plans	5100.5	26323.7	31424.2	29194.8	2229.4	460.0	43.70	8.46	20.63	79.37
5.	1965-66	938.6	3829.7	4768.3	4145.7	444.6	78.0*	47.37	11.61	17.54	82.46

*For 1966-67

Sources: *Cols. 2 to 5 : Combined Finance and Revenue Accounts of the Central and State governments,* 1950-51 to 1965-66 and *Public Finance,* Volume II, 1960-61 to 1966-67, Ministry of Finance, Government of India. *Col. 7 : Selected Educational and Related Statistics,* Planning Commission (1969, p-87).

total Central budget on eudcation but in relation to the total State burden of education, the Centre's assistance has not been very significant. Out of the total Central grants in education, the share of Centrally sponsored programmes has declined whereas the share of grant-in-aid to education has been increasing. This shows that there is a trend at the Centre not to directly involve itself in the financing of educational programmes at the State level.

Further, by applying the same methodology, the grants-in-aid under revenue account for all sectors have been estimated and it is observed that the grant-in-aid given for the educational sector constituted only four per cent in the First Plan and increased to eight per cent in the Third Plan.

Participation of Non-Educational Ministries and Departments

In the revenue account for education of the Central government and the State governments, only the expenditure incurred by the Ministry of Education and Departments of Education is shown; the expenditure incurred by the Ministries and Departments other than those dealing directly with education is excluded. For example, the concerned ministries/departments finance functionally related areas of education such as agricultural education, vocational education, medical and health education, etc. An attempt has, therefore, been made here to see the extent of participation by non-educational departments and ministries in the total scheme of financing of education by the Central and State governments. This has been done by analysing the budgets of individual ministries and departments not dealing with education. This analysis is shown in Table 3. It has been found that non-education departments contributed to the extent of 8.58 per cent of the total expenditure in all the three Plans put together. In terms of total Plan expenditure on education, non-education departments spent a little over 26 per cent in the First Plan and a little less than 33 per cent in the Third Plan. It shows that non-education departments have initiated and financed programmes at a faster speed than the ministries and departments of education deal-

TABLE 3

Total and Plan Expenditure by Education and Non-Education Ministries/Departments of Centre and States during the First, Second and Third Plans

(In crores of Rs.)

		TOTAL EXPENDITURE			PLAN EXPENDITURE		
Sl. No.	*Plan*	*All Ministries and Departments*	*Education Ministry and Departments*	*Col. 3 as % of Col. 2*	*All Ministries and Departments*	*Education Ministry and Departments*	*Col. 6 as % of Col. 5*
	1	2	3	4	5	6	7
1.	First Plan (1951-56)	457.46	414.55	90.62	207 00	152.90	73.86
2.	Second Plan (1956-61)	971.61	849.57	87.44	394.00	273.00	69 29
3.	Third Plan (1961-66)	1,764.18	1,655.36	93.83	874.30	588.70	67.34
4.	All Plans	3,193.25	2,919.48	91.42	1,475.30	1,014.60	68.77

Sources : *Cols. 2 and 3* : *Combined Finance, op. cit. Col. 5* : First and Second Five-Year Plan figures have been taken from *Investment in Education in India*, 1951-63; Table 10 in *Investment in Education*, Unesco 1967. For the Third Plan relationship between plan outlays of all Ministries and Departments and Ministry and Departments of Education has been applied to figures, given in *Col. 6* (i. e., actual plan expenditure). *Col. 6* : *Educational Statistics, op. cit.*

ing directly with education. Further, this implies that while considering the overall problems of the financing of education the role of non-education ministries/departments hitherto ignored is quite significant and may be noted.

Plan and Non-Plan Expenditure on Education

In Table 4, the total expenditure incurred on education by the Central and State governments has been shown along with Plan expenditures. Plan expenditure does not include expenditure incurred by non-education ministries and departments financing education in their functional areas. It is seen that Plan expenditures constituted about one-third of the total expenditures during each of the three Plans. But, when Plan expenditures in relation to total expenditures are analysed separately for the Central and State governments, it is seen that Plan expenditures constituted the bulk of the Central government expenditures on education. Quite the opposite has been the case with the State governments. It is seen that the Central government mostly finances Centrally assisted or Centrally sponsored educational projects, and at the end of each Plan these schemes became part of the normal (committed or non-Plan) budgets of the State governments. As a result, the Central government has, over a period of 15 years of planning, passed on the burden of financing education to the State governments, and this has created serious problems of resource allocation at the State level, where education has to compete for getting resources from the limited and rigid State budgets.

Elasticity of Educational Expenditure

Finally, in Table 5, the total educational expenditures by the Central and State governments have been shown in relation to capital formation and consumption expenditure of the Central government and expenditure under capital and revenue accounts of the State governments. Before going into an analysis of ratio elasticities given in Table 5, it may be mentioned here that the Ministry of Finance since 1957-58, has been presenting economic classifications

TABLE 4

Plan and Non-Plan Educational Expenditures by the Central and State Governments during the First, Second and Third Plans

(In crores of Rs.)

Sl. No.	Plan	TOTAL EXPENDITURE			PLAN EXPENDITURE					
		Centre	*States*	*Total*	*Centre*	*States*	*Total*	*Col. 5 as % of Col. 2*	*Col. 6 as % of Col. 3*	*Col. 7 as% of Col. 4*
	1	2	3	4	5	6	7	8	9	10
1.	First Plan (1951-56)	36.80	420.66	457.46	31.6	121.3	152.9	85.86	28.84	33.42
2.	Second Plan (1956-61)	152.45	819.16	971.61	69.9	203.1	273.0	45.85	24.79	28.10
3.	Third Plan (1961-66)	205.56	1,558.62	1764.18	151.7	437.0	588.7	72.59	28.04	33.37
4.	All Plans (1951-66)	394.81	2798.44	3193.25	253.2	761.4	1,014.6	64.29	27.21	31.77
5.	1965-66	62.21	408.06	470.27	45.5	128.3	173.8	73.14	31.44	36.96

Source : *Cols. 2 to 4, Combined Finance, op. cit.* : and *Cols.* 5 to 7. *Educational Statistics, op.cit.*

TABLE 5

Educational Expenditure in Relation to Central and State Government Expenditure and Gross Domestic Product, during First, Second and Third Plans

(Amount in crores of Rs.)

Sl. No.	*Item*	*First Plan (1951-56)*	*Second Plan (1956-61)*	*Third Plan (1961-66)*	*1965-66*
	1	2	3	4	5
I.	Gross Domestic Product at Market Prices	50,750	66,111	1,00,220	24,052
II.	Central Government				
	(a) Capital Formation	1,605	3,905	7,155	1,806
	(b) Consumption Exp.	1,241	1,962	4,256	1,109
	(c) Total (a+b)	2,846	5,867	11,409	2,915
III.	State Governments' Expenditure on all Sectors				
	(a) Capital Account	997	1,908	3,459	942
	(b) Revenue Account	2,355	3,935	7,293	1,913
	(c) Total (a+b)	3,352	5,843	10,751	2,855
IV.	All Expenditure (II+III)	6,198	11,710	22,160	5,770
V.	Educational Expenditure Incurred by				
	(a) Centre	37	152	205	62
	(b) States	421	819	1,559	408
	(c) Total (a+b)	458	971	1,764	470
VI.	Ratio Elasticity of				
	(a) Total Govt. Expenditure (IV) in relation to GDP (I)	12.21	17.71	22.11	23.99
	(b) Total Educational Exp. (Vc) in relation to Total Govt. Expenditure (IV)	7.38	8.30	7.96	8.15
	(c) Central Govt. Exp. (Va) on Education in relation to total Exp. (II c)	1.29	2.60	1.79	2.13
	(d) Central Govt. Exp. on Education (V a) in relation to consump. Exp. (II b)	2.97	7.77	4.81	5.61
	(e) State Exp. on Edu. (V b) in relation to total Exp. (III c)	12.55	14.02	14.50	14.29
	(f) State Expenditure on education (Vb) in relation to revenue Account (III b)	17.87	20.82	21.37	21.33

Sources *: Row I* : Ministry of Finance, *Report of the Economic Survey,* 1968-69.
Row II : *Reserve Bank of India Bulletin* (1968, pp. 1275-78).

of only Central government budgets in terms of capital formation and consumption expenditure. Similar classification of expenditure is not available with respect to State governments' expenditures. Therefore, it has been possible to show capital and consumption expenditures only of the Central government; State budgets have been shown only in terms of administrative classification, namely, current and capital accounts. Growth in gross domestic product at current prices has been also shown in the table. The ratio elasticities have also been computed and shown in the table.

It is seen from the table that the total Central and State government spending in relation to gross domestic product increased from 12 per cent in the First Plan to 22 per cent in the Third Plan and total expenditure on education in relation to total government expenditure registered a marginal increase from 7.39 per cent in the First Plan to 7.96 per cent in the Third Plan. This obviously shows that finances for the educational sector have remained stable in relation to total government spending on all sectors including education. In other words education has continued to take increasing share from the additional resources mobilised by the governments during the three Plan periods.

But on analysing the budgetary process of the Central and State government separately different trends are observed. The internal allocation pattern of the State governments with respect to education shows that the expenditure on education from the revenue account increased from a little less than 18 per cent in the First Plan to a little less than 21.5 per cent in the Third Plan. And educational expenditure by the Central government in relation to consumption expenditure increased from a little less than three per cent in First Plan to 4.8 per cent in the Third Plan. Further, educational expenditure has also been shown in relation to the total Central government and State governments' expenditure. It may perhaps be appropriate to mention here that the Kher Committee[1] in 1951 suggested

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[1] The Government of India set up the Committee on the Post-War Educational Development in India (also known as the Sargent Committee) in 1944. This Committee prepared a 40-year plan for education up to 1984, and estimated the expenditure implications. These were examined

(*Continued on next page*)

that State government should spend 20 per cent of the revenue expenditure on education and the Central government should spend 10 per cent of revenue expenditure on education. From the table we observe that only State governments have been able to push up expenditure in the field of education beyond the target set out by the Kher Committee; the Central government has lagged far behind the target of 10 per cent. But studying educational expenditure in relation to the total resources of the economy it is seen that slow growth in GDP has not held back the growth in the share of government expenditure for education.

State Governments and Local Bodies

The second stage/type of transfer of resources takes place in the form of grants-in-aid from State governments to local bodies. In Table 6, the amount of grants given by State governments to local bodies in the field of education have been shown along with the State governments' total expenditure on education. It may again be mentioned here that total expenditure does not include expenditures incurred by the non-education departments dealing with education in their functional areas. It is seen from the table that grants-in-aid form about one-third of the State governments' expenditure on education. Further, State governments, like the Central government, also give grants to educational institutions under private management.[3]

In the light of the discussion in the preceding paragraphs an attempt has been made to describe in a diagram, the mech-

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(Contd. from previous page)
by the Committee on the Ways and Means of Financing Educational Development in India (also known as the Kher Committee) in 1950. The Kher Committee suggested that the Central government should spend 10 per cent and the State governments 20 per cent of their respective revenues on education. However, no rational basis was advanced for these ratios.

[3] The Ministry of Education document (1954) and the Report of the Education Commission (1964-66, 491-3) give in detail the trends in the grant-in-aid system followed by the Central government and the State governments with respect to local bodies and institutions.

anism and flow of resources from Central and State governments to the educational institutions This diagrammatic presentation of the mechanism followed in the financing of education is important in appreciating the significance of the analysis according to sources of finance in the subsequent paragraphs.

TABLE 6

Grant-in-aid by the State Governments to Local Bodies during the first three Five-Year Plans

(Amount in crores of Rs.)

Sl. No.	*Plan*	*Total Educational Expenditure*	*Grants-in-aid to Local Bodies*	*Col. 3 as % of Col. 2*
	1	2	3	4
1.	First Plan (1951-56)	394.58	107.95	27.36
2.	Second Plan (1956-61)	758.23	199.91	26.37
3.	Third Plan (1961-66)	1479.56	431.75	29.18
4.	All Plans (1951-66)	2632.37	739.61	28.09
5.	1965-66	382.97	94.02	24.55

Mixed Financing and Participation

There has been mixed financing of education in India. In Table 7 the aggregative picture of the contribution made by different participating organisations in the financing of education has been shown for the period 1950-51 to 1965-66, divided into three Five-Year Plans. Under each source, the contribution to the field of education, shown in the table, is the net of fee-income. Because of this the figures under government sources are not comparable with the figures shown in the preceding tables. Further, the figures in the present table are based on the data supplied by the educational institutions directly to the State government and consolidated by the Ministry of Education. The figures in the previous tables have been compiled from the State and Central government budgets.

TABLE 7

Total Educational Expenditure according to Sources for First, Second and Third Five-Year Plans

(In crores of Rs.)

Sl. No.	Plan/Year	Public Sources			Private Sources			All Sources	External Sources
		Govt.	Local Body	Sub-Total	Internal (Fees)	Endowment & others	Sub-Total		Col.4+Col.6
	1	2	3	4	5	6	7	8	9
1.	1950-51	65.26 (57.1)	12.50 (10.9)	77.76 (68.0)	23.33 (20.4)	13.29 (11.6)	36.62 (32.0)	114.38 (100.0)	91.05 (79.6)
2.	First Plan (1951-56)	452.07 (59.1)	73.38 (9.6)	525.45 (68.7)	162.8 (21.3)	76.32 (10.0)	239.13 (31.3)	764.58 (100.0)	601.77 (78.7)
3.	Second Plan (1956-61)	901.41 (66.4)	93.50 (6.9)	994.91 (73.3)	243.89 (18.0)	119.07 (8.7)	362.96 (26.7)	1357.87 (100.0)	1113.98 (82.0)
4.	Third Plan (1961-66)	1726.20 (69.6)	159.89 (6.5)	1886.09 (76.1)	408.23 (16.5)	184.54 (7.4)	592.77 (23.9)	2478.86 (100.0)	2070.63 (83.5)
5.	All Plans (1951-56)	3079.68 (66.9)	326.77 (7.1)	3406.45 (74.0)	314.93 (17.7)	379.93 (8.3)	1194.86 (26.0)	4601.31 (100.0)	3786.38 (82.3)
6.	1965-66	443.89 (71.4)	38.87 (6.2)	482.76 (77.6)	97.93 (15.7)	41.44 (6.7)	139.37 (22.4)	622.13 (100.0)	580.69 (84.3)

Compiled from *Education in India, Volume II,* 1950-51 to 1964-65 and for 1965-66, data have been compiled from the original records of the Ministry of Education.

From the table it is seen that the financial support of the State and Central governments put together constituted 59.1 per cent in the First Plan and 69.6 per cent in the Third Plan. There has been a decline in the fee income, from 21.3 to 16.5 per cent, during the same period. Similarly, the contribution of local bodies has declined from 9.6 per cent to 6.5 per cent and that of 'endowments and other sources' from 10 per cent to 7.4 per cent during the same period. Analysing the figures in terms of public and private sources of finance, we observe that public sources contributed a little less than 68.7 per cent in the First Plan and 76.1 per cent in the Third Plan. In other words, the public sources have displaced the private sources of finance to the extent of seven percentage points. Again, fee income as an 'internal source' of finances has shown a decline of five percentage points from the First to the Third Plan. On the whole, we observe that despite decentralisation in the administrative set-up of education followed during the last decade and a half, there is a definite trend towards centralisation and state control in the financing of education. This further shows that the overtime burden of financing education is being shifted to the state and that private participation is bound to decline further. This has implications in terms of mobilisation of the resources needed for financing education.[8] However, this trend is in line with the experience of other countries. For example, Vaizey (1958, p. 56) has shown that even in the U.K. the role of private financing in education during 1920-1955, has remained limited. Also Edding (1969, pp. 43-44) has shown that the contribution of private sources has declined during the past decades in Canada, Colombia, Hungary, Sweden, and even Japan.

Financing of Institutions and Programmes

Educational expenditure is classified into 'direct expenditure' and 'indirect expenditure'. Direct expenditure is that which is incurred directly for running educational institutions. It includes expenditure on salaries of staff, contingencies, recurring expenditure on equipment, maintenance of buildings, etc. Indirect expenditure is the sum total expenditure on direction, inspection, buildings (other than maintenance), non-recurring equipment, scholarships, stipends and other financial concessions, and postal charges (excluding mess charges).

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[8] These and other issues have been clearly discussed in *Report of the Study Group on Resources Mobilisation,* Asian Institute of Educational Planning and Administration, New Delhi, 1970

Table 8 shows changes in the sources of educational finance according to major components of school and higher education. The share of government finance has displaced all other sources of finance with respect to all institutions except the professional educational institutions. The share of expenditure by the government has gone up for the school stage, from 56.49 to 71.54 per cent, as against the corresponding increase in the share of expenditure by the government for higher education, from 47.91 to 59.78 per cent during the same period. The share of government finance has increased from 75.32 to 84.17 per cent with respect to vocational education.

The relative position of fees among the sources of finance has declined by about five percentage points with respect to both school and higher education put together. 'Other sources' have improved their position with respect to professional higher education and remained constant for general higher education. The relative contribution of local bodies has declined invariably in all cases. Government contribution has shown an upward trend with respect to buildings and equipment from 58 to 72 per cent; for scholarships from 80 to 94 per cent; and it has remained constant with respect to hostels. The fee-income contribution has increased from 29.41 to 42.55 per cent with respect to hostel facilities. It is observed that there has been a rising trend in the contribution of the state to education by 15 percentage points and this has displaced fee income, and income from other sources and local bodies by almost five percentage points in each case. This trend has been in fact noted in the previous section.

Institutional Finance by Management

Educational institutions are managed by the following authorities:

TABLE 8

Sources of Educational Finance by Sectors in India, 1950-51 and 1964-65

Sl. No.	Institution/Type	1950-51				Total	1964-65			
		Govt	*Local Body*	*Fees*	*Other Sources*		*Govt.*	*Local Body*	*Fees*	*Other Sources*
	1'	2	3	4	5	6	7	8	9	10
1.	*School Stage*									
	(a) General Education	55.33	16.22	21.34	7.11	100.00	71.21	8.79	15.23	4.77
	(b) Vocational Education	75.32	2.37	11.71	10.60	100.00	84.17	0.40	8.25	7.18
	(c) All School Stage	56.49	15.06	20.25	8.20	100.00	71.54	8.56	14.97	4.93
2.	*Higher Education*									
	(a) University Department	40.71	0.03	35.34	23.92	100.00	64.12	0.06	27.42	8.40
	(b) Colleges for General Education	38.31	0.25	51.09	10.35	100.00	42.38	0.23	47.18	10.21
	(c) Colleges for Professional Education	70.18	0.63	20.31	8.88	100.00	66.95	1.03	9.20	22 82
	(d) All Higher Education	47.91	0.27	38.55	13.27	100.00	59.78	0.47	31 59	8.16
3.	*All Institutions (1+2)*	54.80	12.19	23.80	9.21	100.00	68.38	6.38	19.44	5.80
4.	*All Programmes*									
	(a) Directions & Inspections	96.10	3.62	0.00	0.27	100.00	98.52	1.48	—	—
	(b) Buildings & Equipment	57.98	8.39	5.02	28.61	100.00	72.52	6.61	4.74	16.13
	(c) Hostels	42.03	1.19	29.41	27.37	100.00	42.81	0.91	42.55	13.73
	(d) Scholarships	79.79	3.31	2.14	14.76	100.00	94.08	0.76	2.78	2.38
	(e) Unspecified	64.29	6.14	10.09	19.48	100.00	64.59	4.44	11.22	19.75
	(f) All Programmes (a to e)	65.88	5.00	7.09	21.03	100.00	79.92	3.80	5.83	10.45
5.	Total (3+4)	57.10	10.90	20.40	11.60	100.00	71.40	6.20	15.76	6.70

(a) Central government and State governments; (b) local boards (district boards, municipal boards, cantonment boards, notified area committees, zila parishads, panchayat samities); (c) universities and government-aided private organisations; and (d) private unaided organisations.

In Table 9 direct expenditure according to sources of finance has been shown for different types of educational institutions under four types of managements for the selected years 1950-51, 1955-56, 1960-61 and 1964-65. From 1950-51 to 1964-65, government participation in the financing of institutions under government management has increased from 86.1 per cent to 91.0 per cent; from 53.7 per cent to 74.9 per cent for institutions under local bodies; from 42.3 per cent to 53 per cent in private aided institutions. The participation of local bodies has been negligible in the institutions under government management, or private aided and unaided management, and their participation-rate in the financing of institutions under their own management has decreased from 36.6 per cent in 1950-51 to 21.6 per cent in 1964-65. Fee income as a source of finance has declined from 12.7 per cent in 1950-51 to 8.2 per cent in 1964-65 in the institutions under government management; from 7.8 per cent to 2.6 per cent in institutions under local bodies; and from 38 per cent to 35 per cent in private aided institutions. But in unaided institutions fee contribution has increased from 62.2 per cent in 1950-51 to 66.6 per cent in 1964-65. The role of endowments in the financing of institutions under government and under local bodies has been insignificant. The contribution of endowments and other sources has declined from 16.3 per cent to 11 per cent in private aided institutions and from 37.8 per cent to 27.8 per cent in private unaided institutions, during 1950-51 to 1964-65. Trends in participation rates of different sources in the individual types of institutions under different managements can be seen from the table.

Growth and Changes in the Allocation Pattern

Table 10 gives changes in the allocation pattern and growth of educational expenditure according to institutions and programmes in

ls									
	98.8	0.1	0.1	1.0	100 0	59.7	37.4	1·0	
6	99 2	0.1	0.3	0.4	100.0	64.1	33.0	1.6	
-61	99.7	0 1	0.3	0.9	100.0	74.3	24.9	0.1	
64-65	99.6	neg.	0.3	0.1	100.0	80.5	19.0	0.2	
Middle Schools									
1950-51	93.4	neg.	5.9	0 7	100.0	33.2	39.4	27.2	
1955-56	94.2	1.1	3.4	1.3	100.0	56.3	26.3	15.4	
1960-61	97.9	neg.	1.6	0.5	100.0	68.5	23.9	4 0	
1964-65	98.0	neg.	1.8	0.2	100.0	73.1	22.5	2.8	
First Level of Education (Primary & Middle Schools)									
1950-51	97.1	0.1	1.9	0.9	100.0	57.0	37.4	3 7	
1955-56	97 8	0.4	1.2	0.6	100.0	62.8	31.8	4.1	
1960-61	99.1	neg.	0 7	0.2	100.0	72.3	24 5	1.5	
1964-65	99 0	neg.	0 9	0.1	100.0	77.8	20.3	1 1	
High/Higher Secondary Schools									
1950-51	77.7	0.1	18.5	0 9	100.0	21.9	25.1	51.1	
1955-56	79.6	0.2	15.5	1.7	100.0	22.5	34.6	41.6	
1960-61	85.3	0.1	14.1	0.5	100.0	34.7	37.9	26.	
1964-65	86.6	neg.	12.8	0.6	100.0	56.0	29 1	13.	
Vocational Schools									
1950-51	95.2	0.1	3.5	1.4	100 0	13.8	78.7	3.	
1955-56	93.5	0.1	3.0	3.3	100.0	44.9	49.6	2.3	
1960-61	94.71	neg.	3.7	1.6	100.0	39.3	56.6	2.2	
1964-65	99.3	neg.	0.4	0.3	100.0	65.2	8.3	3.1	
Second Level (Includes Expenditure on Boards of High/Higher Secondary Education and Schools for Special Education)									
1950-51	80.6	0.4	18 0	1.0	100.0	21.7	27.5	48.9	
1955-56	78.5	0.1	19 1	2.3	100.0	23.0	35.2	40.5	
1960-61	84.3	neg.	14.7	1.0	100.0	35.1	38.2	25.8	
1964-65	85.3	neg.	14.2	0.5	100.0	56.5	29.0	12.9	
Universities									
1950-51	56.3	—	41.1	2.6	100.0	—	—	—	
1955-56	18.6	—	73.5	7.9	100.0	—	—	—	
1960-61	—	—	—	—	—	—	—	—	
1964-65	96.3	—	2.8	0.9	100 0	—	—	—	
General Education Colleges									
1950-51	68.4	—	30.7	0.9	100.0	7.8	27.9	62.6	1.7
1955-56	68·1	—	30.2	1.7	100.0	10.1	9.4	80.5	—
1960-61	72.7	—	25.0	2.3	100.0	20.5	53.8	25.7	—
1964-65	71.5	neg.	27.2	1.3	100.0	5.2	35.7	30.7	28.4
Professional Education Colleges									
1950-51	84.3	—	14.2	2.5	100.0	20.1	38.1	41.3	0.5
1955-56	82.2	—	15.9	1.9	100.0	9.9	55.5	32.0	2.6
1960-61	84.8	—	13.4	1.8	100.0	0.3	77.2	18.4	4.1
1964-65	89.5	—	9.2	1.3	100.0	1.1	80.4	18.1	0.4
Third Level (Including Research Organisations having Teaching Functions)									
1950-51	77.2	—	20.7	2.1	100.0	16.5	35.2	47.4	0.9
1955-56	76.9	—	21.1	2.0	100.0	9.9	46.7	41.1	0.3
1960 61	82.5	—	15.8	1.7	100.0	0.6	79.3	16.5	3.6
1964-65	86.6	neg.	12.4	1.3	100.0	1.2	69.3	14.4	15.1
All Levels of Education									
1950-51	86.1	neg.	12.7	1.3	100.0	53.7	36.6	7.8	1.9
1955-56	86.3	0.2	12.0	1.5	100.0	58.5	32.2	8.1	1.1
1960-61	89.7	neg.	9.4	0.9	100.0	67.9	26.2	4.2	1.7
1964-65	91.0	neg.	8.2	0.8	100.0	74.9	21.6	2.6	0.9

Source : *Education in India,* Vol. II, 1950-51, 1955-56, 1960-61 and 1964-65.

tions increased at the rate of 14.3 per cent; on buildings and equip-

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ment, it increased at an annual rate of 12 per cent; and on scholarships it increased at 17.5 per cent. Analysis of the allocation pattern reveals that the ratio between 'direct' and 'indirect' expenditure has remained constant (4:1) during the three Five Year Plans. The share of primary and middle schools in the total expenditure has decreased from 38.7 per cent in the base year to 34.5 per cent in the final year. The share of higher education has increased from 15 per cent to 20.4 per cent during the same period. This shift in the allocation pattern from lower levels to higher levels is in line with the experience, for example, in Japan, Canada, Germany, etc., (Edding, 1969, pp. 38-39).

We also note that expenditure on buildings and equipment was 8.6 per cent in the base year and 8.7 per cent in the final year. There is thus a preponderance of recurring expenditure in the total expenditure on education. This trend is quite opposite to the experience of the more advanced and even of developing countries where it is generally observed that over a period of time there is gain of weight on the side of capital expenditure in the total expenditure. For example, Unesco, 1970 estimated that capital expenditure constituted 21.2 per cent of total expenditure in 1960 and 20.9 per cent in 1965, for 15 developed countries (with *per capita* income of the order of $1000 and above) as against 9.8 per cent in 1960 and 14.4 per cent in 1965 for 30 developing countries (*per capita* income below $1000). (Unesco, 1970, p. 58).

Before closing the discussion on the trends in the allocation pattern and growth in expenditure, it is appropriate to mention that estimated expenditure for 1965-66, as given in the Report of Education Commission, falls short of the actual expenditure by a little less than four per cent. But break-ups of actual and estimated expenditures show a number of variations, as can be seen from Table 11.

Year-wise Distribution

In Table 12, the year-wise distribution of total expenditure in terms of *Plan expenditure* and *other-than-Plan expenditure* is given. It is observed that the bulk (around 60 per cent) of the *Plan expen-*

TABLE 11

Extent of Over-or Under Estimation of Educational Expenditure by the Education Commission for 1965-66

Amount in crores of Rs.

Sl. No.	Item	Education Commissions Estimate	Actual	Col.2-Col.3	Col.3/Col.2
	1	2	3	4	5
1.	First level of Education	194.9	214.2	−19.3	109.9
2.	Second level of Education	151.6	152.6	− 1.0	100.7
3.	Third level of Education	103 0	127.0	−24.0	123.3
4.	All Educational Institutions	499.5	493.8	−44.3	109.8
5.	All Programmes	150.5	128.3	+22.2	85.2
6.	Total (4+5)	600.0	622.1	− 22.1	103.7

Source : Ibid.

diture is spent towards the last two years of the each Plan period. However, in terms of its components given in Cols. 2 and 3, it is seen that there is more stability in investment in technical education than in general education, where it is seen that the expenditure in the first year of each Plan is less than the expenditure in the last year of the preceding Plan. In terms of absolute size, for example, the Plan expenditure on general education in the first year of the Second Plan was only 19 crore rupees as against 42.4 crore in the last year of the First Plan; it was 51.5 crore rupees in the first year of the Third Plan as against 75.7 crore in the last year of the Second Plan. This erratic behaviour of expenditure shows that the *Plan expenditure* is not planned well and affects the overall growth and efficiency of education. As a result, in Col. 6 it is seen that the year-wise proportions of Plan expenditure to total expenditure increase as the Plan moves on but suddenly decrease when the next Plan begins. Therefore, in order to have stability in the educational industry, growth in the two types of expenditures should go hand in hand.

Another interesting point comes up from the analysis of alloca-

TABLE 12

Year-Wise Distribution of Plan Expenditure and Non-Plan Educational Expenditure, 1950-51 to 1965-66

S.No.	Year	Year-wise Percentage Distribution of Plan Expenditure			Year-wise % Distribution of Non-Plan Expenditure	Plan Expenditure as % of Total Expenditure
		General Education	Technical Education	Total Education		
	1	2	3	4	5	6
1.	1951-52	12.1	18.3	12.9	17.1	15.9
2.	1952-53	13.9	19.3	14.7	18.8	16.3
3.	1953-54	16.8	21.3	17.4	19.8	18.0
4.	1954-55	25.2	19.3	24.4	20.9	22.6
5.	1955-56	32.0	21.8	30.6	23.4	24.7
	Total First Plan	100.0	100.0	100.0	100.0	20.0
	Amount (in crores of Rs.)	132.7	20.2	152.9	611.71	
6.	1956-57	8.5	11.1	8.9	16.8	11.8
7.	1957-58	13.0	13.7	13.1	18.9	14.9
8.	1958-59	18.4	17.9	18.4	19.9	18.8
9.	1959-60	26.3	27.5	26.5	21.0	24.1
10.	1960-61	33.8	29.8	33.1	23.4	26.2
	Total Second Plan	100.0	100.0	100.0	100.0	20.1
	Amount (in crores of Rs.)	224.1	48.9	273.0	1084.87	
11.	1961-62	11.1	15.0	11.9	17.3	17.7
12.	1962-63	14.6	16.8	15.1	18.7	20.1
13.	1963-64	18.4	19.1	18.6	19.8	22.6
14.	1964-65	24.9	22.4*	24.4*	20.7	26.8
15.	1965-66	31.0	26.7	30.0	23.5	28.6
	Total Third Plan	100.0	100.0	100.0	100.0	23.7
	Amount (in crores of Rs.)	463.9	124.8	588.7	1890.15	

* Includes expenditure to the extent of 2.6 per cent, year-wise breakup of which is not available.

Source : Selected Educational and Related Statistics (1969, p. 90).

TABLE 13

Sectoral Allocation Pattern of Plan Expenditure in three Five Year Plans

Sl. No.	*Level/Type of Education*	*Ist Plan*	*IInd Plan*	*IIIrd Plan*
	1	2	3	4
1.	Elementary	56	35	30
2.	Secondary	13	19	18
3.	University	9	18	15
4.	Technical Education	13	18	21
5.	Others	9	10	16
6.	Total	100.0	100.0	100·0

Source : Ibid., p. 99.

tions of *Plan expenditure* in the educational sector given in Table 14 is that the share of elementary education has come down from 56 per cent in the First Plan to 30 per cent in the Third Plan. The share of secondary education has remained stable, while the share of higher education has increased from 9 to 15 per cent and that of technical education has increased from 13 to 21 per cent.

Socio-Economic Aggregates and Education

In this section of the present paper, growth in educational expenditure is juxtaposed with growth in population, GNP at factor cost, and enrolment. From Table 14, it is observed that the educational expenditure has increased at an annual rate of 11.9 per cent as against only 2.1 per cent annual growth in population, 5.5 per cent growth in GNP and 7.1 per cent growth in enrolment. As a result, the share of GNP allocated to education has increased from 1.17 in the base year to 2.85 in 1965-66, and the *per capita* educational expenditure has gone up from Rs. 3.16 to 12.57 during the three Plan periods. The cost per pupil has doubled during the same period.

In Table 15, growth in the educational expenditure and its physical capital formation component have been put side by side with the growth in DNP, GDP, National Consumption expenditure and

TABLE 14

Growth in Socio-Economic Aggregates in Relation to Educational System in India, 1950-51 to 1965-66

Sl. No.	*Year*	In Crores				*Educational Expenditure as%of GNP (Rs.)*	*Educational Expenditure Per Capita (Rs.)*	*Cost per pupil (Rs.)*
		Population	*GNP at factor cost (Rs.)*	*Educational Expenditure (Rs.)*	*Enrolment*			
	1	2	3	4	5	6	7	8
1.	1950-51	36.14	9807	114.38	2.55	1.17	3.16	44.85
2.	1951-52	36.14	10285	124.56	2.66	1.21	3.39	46.83
3.	1952-53	37.35	10156	137.64	2.75	1.36	3.68	50.83
4.	1953-54	38.02	10849	147.74	2.91	1.36	3.89	50.76
5.	1954-55	38.73	9996	165.01	3.13	1.65	4.26	52.72
6.	1955-56	40·28	10424	189.66	3-39	1.82	4.80	55.72
7.	1956-57	41.12	11783	206.29	3.60	1.75	5.12	55.95
8.	1957-58	42.12	11945	240.65	3.80	2.01	5.85	57.30
9.	1958-59	42.01	13233	266.15	4.14	2.01	6.33	63.33
10.	1959-60	42.94	13618	300.40	4.45	2.21	7.00	64.29
11.	1960-61	43.92	14044	344.38	4.80	2.45	7.84	67.51
12.	1961-62	44.95	14874	396.36	5.43	2.66	8.84	71.75
13.	1962-63	46.02	15821	441.75	5.80	2.79	9.60	72.99
14.	1963-64	47.13	18113	484.11	6.17	2.67	10.27	76.16
15.	1964-65	48.28	21198	534.51	6.74	2.05	11.07	78.46
16.	1965-66	49.48	21799	622.13	7.05	2.85	12.57	88.87
17.	Geometric Annual Growth Rates	2.1	5.5	11.9	7.1	6.4	9.8	4 8

Sources : *Col. 1* : *Report of the Expert Committee on Population Projections*, Registrar General of India. *Col. 2* · *Report of the Economic Survey*, 1968-69. *Col. 3* : See Table 7.

TABLE 15

Educational Expenditure in Relation to Economic Aggregates like GNP, GDP, GCE, GDCF, during First, Second and Third Plans

(In crores of Rs.)

Plan	Gross National Product at Factor Cost (GNP)	Gross Domestic Product at market prices (GDP)	National Consumption Expenditure (GCE)	Gross Domestic Capital Formation at Factor Cost (GDCF)	Total Educational Expenditure	Total Capital Formation in Educational Sector	Col. 6 as percentage of			Col. 7 as percentage of Col. 5
							Col. 2	Col. 3	Col. 4	
1	2	3	4	5	6	7	8	9	10	11
First Plan										
(i) Amount	51,710	50,750	44,105	5,115	765	67				
(ii) Geometric Growth rate	1.25	1.50	0.75	8.0	10.5	15.00	1.48	1.51	1.73	1.30
Second Plan										
(i) Amount	64,623	66,111	55,547	9,420	1,625	156				
(ii) Geometric Growth rate	6.00	8.00	7.50	11.0	13.0	17.0	2.51	2.46	2.92	1.66
Third Plan										
(i) Amount	91,805	100,22	80,364	16,765	2,479	2157				
(ii) Geometric Growth rate	9.00	10.00	9.00	12.00	12.5	8.0	2 70	2 47	3.08	1.53
1965-66	21,799	24,052	19,055	4,269	622.13	54.47	2.85	2.59	3.26	1.28

Sources : Cols. 1 to 5 : Lal (1970), CSO, (1967) and *Report of the Economic Survey*, 1968-69 : *Col. 6* · See, sources for Table 7.

GDCF. It is seen that educational expenditure in relation to GNP has increased from 1.48 to 2.70 per cent from the First Plan to the Third Plan, from 1.51 to 2.47 per cent in relation to GDP, and from 1.73 to 3.08 per cent of the National Consumption expenditure during the same period. Thus educational expenditure, whether treated as consumption expenditure or investment, has increased faster than both of these series. Even physical capital formation in education rose from 1.3 to 1.53 per cent of the total physical capital formation during the period under study.[4]

Inter-Regional Comparisons

Finally, the growth in educational expenditure in India and its relationship with (Centre and State) government expenditure and national income during 1960-1965, are compared with these items for the major groups of countries in Table 16.

It is interesting to note that annual growth rates in the educational expenditure of different groups of countries fall in the range of 11.4 to 18.5 per cent, and the corresponding position for India falls almost within the middle of the range. In terms of budgetary allocations to education, the developed and developing countries do not show any marked differences, and both were very close to the world average in 1960 and 1965. But the Indian position does not compare very well with any of the regions included in the table (Edding, 1970). The percentage of budget allocated to education in India in fact, declined during the period 1960-65, and this trend is quite opposite to the experiences in other regions, as shown in the table.

In terms of the part of national income allocated to education, significant differences are noted between the developing and develop-

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[4] Elasticity co-efficients of educational expenditure with respect to GNP at factor cost, NNP at factor cost and total consumption expenditure for the period 1950-51 to 1965-66 were 2.00, 2.05 and 1.90 respectively. These co-efficients have been computed for GNP, NNP, consumption expenditure and educational expenditure at current prices.

TABLE 16

Growth in Educational Expenditure in terms of Size and in relation to Budget and National Income : International Comparisons, 1960 and 1965

Sl. No.	*Country*	*Total Educational Expenditure (1960-65)*		*Public Expenditure as percentage of the Budget*				*Public Expenditure as percentage of National Income*			
		No. of countries	Average annual growth	No. of countries (1960)	Percentage	No. of countries (1965)	Percentage	No. of countries (1960)	Percentage	No. of countries (1965)	Percentage
	1	2	3	4	5	6	7	8	9	10	11
1.	Africa	14	13.5	23	14.5	36	16.4	21	3.0	22	4.3
2.	North and Central America	10	11.4	10	15.6	18	17.6	15	3.9	14	4.1
3.	South America	4	18.5	7	12.6	10	15.4	11	3.1	11	4.0
4.	Europe including USSR	24*	14.5*	17	11.8	28	13.2	16	3.3	16	4.0
5.	Asia	20	14.8	13	13.5	23	15.0	25	4.2	24	5.3
6.	Oceania	2	11.4	4	10.4	10	15.7	2	3.7	2	4.4
7.	World	—	—	74	13.5	125	15.5	90	3.6	89	4.5
8.	Developed countries	—	—	15	13.6	15	15.9	20	4.7	20	6.2
9.	Developing countries	—	—	30	13.2	30	15.5	30	2.9	30	3.8
10.	India	1	12.5	1	9.3	1	8.15	1	2.45	1	2.85

*Excludes the U.S.S.R. for which annual growth rate was 10·5.

ed countries. In 1960, the developing countries devoted only 2.9 per cent of the national income to education as against 4.7 per cent in the developed countries. In 1965, the proportion of national income in the developing countries increased to 3 8 per cent while in the developed countries it increased to 6.2 per cent. In India the proportion of income devoted to education showed only a marginal increase, i.e., from 2.45 per cent to 2.85 per cent during 1960-65. Again, this proportion is lower than the proportions for other regions shown in the table. No doubt the growth in size of expenditure on education in India is in line with the corresponding growth in educational expenditure elsewhere, yet we note that educational expenditure, both in terms of budgetary allocations as well as in relation to national income, compares unfavourably with all the groups of countries that have been considered.

REFERENCES AND BIBLIOGRAPHY

Agarwal, P P. *The System of Grants-In-Aid in India.* New Delhi: Asia Publishing House, 1959.

Arrow, K. Criteria for Social Investment. In *Readings in the Economics of Education.* Paris: Unesco, 1968.

Administrative Reforms Commission, Government of India, New Delhi. (a) *Report of the Study Team on Centre-State Relationships* (three volumes), (b) *Report on Planning Machinery,* 1967.

Asian Institute of Educational Planning and Administration, New Delhi *Report of the Study Group on Resources Mobilisation, 1970.* (Mimeographed).

Comptroller and Auditor General of India, New Delhi. *Combined Finance and Revenue Accounts of the Central and State Governments,* 1950-51 to 1965-66.

Edding, F. *International Development of Educational Expenditure.* Paris: Unesco, 1969.

Finance Commission, Government of India, New Delhi. (a) *First Report,* 1951; (b) *Second Report,* 1957; (c) *Third Report,* 1961; (d) *Fourth Report,* 1965; (e) *Fifth Report,* 1969.

Government of India, New Delhi *The Constitution of India,* 1960.

Lal, R.N. Capital Formation in India: 1950-51 to 1965-66 Paper contributed at the Seventh Indian Conference on Research in National Income of IARNI&W, Hyderabad, 1970.

Ministry of Education, Government of India, New Delhi. *Report of the Committee on the Relationship between State Governments and Local Bodies in the Administration of Primary Education*, 1954.

Ministry of Education, Government of India, New Delhi. *Manual of Educational Statistics* (First Edn.), 1964.

Mukerjee, M. *National Income of India. Trends and Structure* Calcutta: Statistical Publishing Society, 1969.

Peacock, A *et al. Educational Finance: Its Sources and Uses in the United Kingdom*, London: Oliver and Boyd, 1968.

Planning Commission (Education Division), Government of India, New Delhi. *Selected Educational and Related Statistics at a Glance* 1969 (Mimeographed).

Pryor. F. R. *Public Expenditures In Communist and Capitalist Nations* London: George Allen and Unwin, 1968.

Unesco, Paris. *Educational Planning: A World Survey of Problems and Prospects*, 1970.

Vaizey, J. *The Costs of Education* London: George Allen and Unwin, 1958.

Vaizey. J. and Sheehan, J. *Resources for Education.* (An Economic Study of Education in the United Kingdom, 1920-65). London: George Allen and Unwin Ltd, 1968.

Venkataraman, K., *Centre-State Finances in India.* London: George Allen and Unwin, 1967.

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Generalizations regarding the Learning Process and Their Implications for Science Education

R. M. Kalra

This review of generalizations regarding the learning process is based on the findings of significant studies reported between 1929 and 1967. The author discusses the learning processes and their implications for science education.

One of the most satisfying experiences a teacher can have is to see the gleam in the eyes of a highly motivated student. Intelligent and pointed questions that show a student really cares about science is the response every science teacher desires.

A few boys and girls are just naturally highly motivated, but no matter how the teacher varies his classroom technique, some students still stare out the window. Of course some of them just do not have the capacity for the work—a problem we can accept without too much frustration. It is the student who can do the work, yet shows no interest, who represents the real challenge to the dedicated science teacher.

Now, the student's interest is only aroused when he sees a real use in what he is to learn—when it satisfies some felt need, provides some value he accepts, some control he wishes to possess. Accordingly, science teachers must provide the environment which affords both the experience desired by the student as well as a basis for the formal educational goals of the school.

The author is grateful to Bernhard Holweg and P. Enns for their valuable assistance in writing this article.

In order to achieve the above aim, teachers must recognize the following generalizations regarding the learning process and their implications for science education.

I

LEARNING—ACQUISITION OF KNOWLEDGE

> *Generalization* 1: Learning takes place with relatively greater effectiveness when the learner is provided with frequent knowledge of what progress he is making provided such knowledge is given soon after the learning experience.

The subject of learning and reinforcement has been the object of much investigation ever since Thorndikes's experiments in 1898 There is much evidence to support the generalization above. The knowledge of progress does indeed act as a reinforcement and thus aids in the learning process.

One of the most comprehensive studies made on the influence of knowledge of progress was that of Book and Norvelle.[1] The ability of 124 samples was tested for their ability to make legible "a"s. The group with knowledge of progress excelled the other in each of the first ten practice periods but lost its advantage when knowledge of progress was withheld. A somewhat similar experiment was conducted by Ross.[2] Of two college groups he tested for their ability to do a simple motor act, the group having full knowledge of progress gained a distinct advantage over the group that did not.

The most common classroom device used to give knowledge of progress is tests and quizzes. Standlee and Popham[3] point out that quizzes and tests affect student learning by acting as an enforced activity with respect to the subject-matter. Using students in philosophy at the college level, Deputy[4] found that with three groups he tested, sections having written tests during the term did significantly better than the section having no tests but only oral reviews. Hertzberger, Heilman and Leuenberger[5] administered short quizzers to students taking a course in educational psychology each week. After the first five weeks the authors found the group using the objective tests to be superior in achievement. Fitch, Drucker and Norton[6] came to a similar conclusion testing college students taking a course in government.

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[1] W.F. Book, L. Norvelle, "An Experimental Study of Learning Incentives," *Pedagogical Seminary*, XXIX (December, 1922), 305-362.

[2] C.C. Ross, "The Influence Upon Achievement of the Knowledge of Progress," *Journal of Educational Psychology*, XXIV (October, 1933), 609-619.

[3] Lloyd S. Standlee, W.J. Popham, "Quizzes Contribution To Learning," *Journal of Educational Psychology*, LI (December, 1960), 322-325.

There is some research evidence to support the theory that the lower intelligence groups particularly benefit from the reinforcement value of knowledge of progress. After conducting an experiment on knowledge of progress, Fay concluded that "students of low intelligence particularly need to know their marks."[7] Similar observations were made by Kulp[8] and Noll[9] in experiments they conducted.

Studies conducted by Keller and Skinner[10] indicate that there is a definite time relationship between the response and the effect it produces on the learner. Kimble,[11] in an experiment found that immediate feedback appears to be necessary for learning to progress rapidly.

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[4] E.C. Deputy, "Knowledge of Success As a Motivating Influence on College Work," *Journal of Educational Research*, XX, (December, 1929), 327-334.

[5] O.E. Hertzberger, J.D. Heilman, W.D. Leuenberger, "The Value of Objective Tests as Teaching Devices," *Journal of Educational Psychology*, XXIII, (May, 1932), 371-380.

[6] W.L. Fitch, A J Drucker, J.A. Norton, "Frequent Testing As A Motivating Factor in Large Lecture Classes," *Journal of Educational Psychology*, XLII, (January, 1951), 1-20.

[7] P.J. Fay, "The Effect of the Knowledge of Results on Subsequent Achievement of College Students," *Journal of Educational Psychology*, XXVIII, (October, 1937), 548-554.

[8] D.H. Kulp, 'Weekly Tests for Graduate Students?", *School and Society*, XXXVIII, (July, 1933), 157-159.

[9] V.H Noll, 'The Effect of Written Tests upon Achievement in College Courses: An Experiment and Summary of Evidence," *Journal of Educational Research*, XXXII, (January, 1939), 345-358.

[10] R.M. Gagne, *The Conditions of Learning*, (New York: Holt, Rinehart and Winston, Inc., 1965), p. 224.

[11] P.M Symonds, *What Education has to Learn from Psychology*, (Columbia University Bureau of Publications, 1964), p. 17.

How frequent should knowledge of success be given? Lewis[12] found that as far as the immediate acquisition of a skill was concerned, 100 per cent reinforcement was desirable. When, however, the learning task is more complex, such a degree of reinforcement may not be necessary and possibly even hinders learning.

Implications for Science Education

According to the evidence cited, the learner needs to have immediate feedback of his progress if learning is to progress quickly. This principle has been frequently neglected in educational practice and particularly in the evaluation procedures and correction of lab. notebooks in a science class. Quite often a science teacher will allow such an extended amount of time to elapse between the evaluation and the feedback to the student that the effect of knowledge of performance is negligible in facilitating learning.

Tests and lab recordings should be marked and returned to the student as quickly as possible. No doubt, the correcting of the lab notebooks presents a real problem to a science teacher. In the present writer's opinion the teacher should correct lab notebooks during class time, thus allowing "feedback" to the students.

It is also evident from the research evidence that knowledge of progress given frequently is valuable for reinforcement. Perhaps the brighter student will not need to have the knowledge of progress he makes, made available to him externally as often as slower students because the brighter students are more capable of internal checking. The studies made by Noll[13] and Fay[14] indicate that lower ability groups particularly benefit from frequent knowledge of progress. A science teacher teaching such groups would be well advised to give knowledge of progress often and after smaller learning steps.

From what is known of reinforcement and knowledge of progress it is evident that a child must be given a curriculum in which he can experience success. A student who experiences related failures is likely to give up trying to learn altogether. There may be some value in difficult exercises and examinations but if they result in repeated failure their value can be questioned. The old saying "nothing succeeds like success" still holds good.

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[12] J.M. Stephens, *The Psychology of Classroom Learning,* (New York: Holt, Rinehart & Co., 1965), p. 215.

[13] Noll, *op. cit ,* pp. 345-358.

[14] Fay, *op. cit.,* pp. 548-554.

Recently in India, efforts have been made by a few diverse groups, like the National Council of Educational Research and Training, the National Science Foundation (N.S.F.) and the National Council of Science Education, to redirect high school science. The senior science courses are being designed along the lines of PSSC, CBA, HPPS and BSCS.

These new science courses are useful for the average and above-average student who is interested in taking the sciences at higher level in his later life. Most of these students achieve reasonable success in the above courses.

But there is a particular group of students in senior science classes who do not achieve reasonable success because they are unable to cope with the new course or because they cannot see the relevance of the course for later life.

Thus, to ensure success for a greater number of students in the sciences at senior level, especially in rural high schools in India, two types of courses should be offered:

1. A terminal course in every science (e.g., a terminal course in chemistry, physics and biology), which is related to a student's life. This terminal course will enable young students to develop skills and acquire knowledge which will produce a better way of life for them in their rural environment, which will make it possible to lead the students .to the discovery of knowledge.

   This new science course must serve the student's future, i.e., equip him to provide leadership in rural communities. To achieve this goal, emphasis must be laid on the practical understanding of science.

   Such a terminal course in science would allow students to experience success and enjoy the subject.
2. A modern course, designed for those students who will specialize in science. This course should be along the lines of PSSC, CBA, HPPS and BSCS, taking the Indian environment into consideration.

> *Generalization* 2: Learning proceeds most effectively when the activity or material to be learned is geared to the level of the learner's readiness. Such readiness may be defined as physical maturity, mental age, or the skills or operations required to perform a certain task.

There has been considerable experimentation done on the effect of a child's chronological age and his ability to perform various skills But since we are concerned here more with the acquisition of knowledge the studies cited to support the generalization above will be limited to readiness, meaning thereby mental age and what Woody[15] calls "educational readiness."

Foster[16] showed in an experiment with children between the mental ages of 3 to 5 that the ability to memorize stories improved from mental age 3 to 5. Morphett and Washburne[17] found in studying reading readiness that children with a mental age of 5 could not learn to read whereas children with a mental age of 6-6 made satisfactory progress Frandsen[18] reports a study by Brueckner which showed that mental age was significantly related to progress. In another study, Washburne[19] and his committee found, in his extensive investigation,. that with increasing mental maturity a greater percentage of students were able to meet the criterion of satisfactory learning of various skills in arithmetic. Guided by maturation achievement curves, his committee recommended the mental age placements for various arithmetic concepts and skills. Brownel[20] found by using diagnostic tests that students were "educationally ready" to take various steps in arithmetic at different times This was evidently more a result of previous learning, he contended, than a physiological or psychological readiness. Although Gagne[21] did his research in the area of transfer his studies imply that a pupil is ready for the materials at some given level only if he has attained the learning sets up to that level.

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[15] F.T. Tyler, "Issues Related to Readiness to Learn," *National Society For the Study of Education,* LXIII, Part I, (Chicago: University of Chicago Press, 1964), p. 229.

[16] A.N. Frandsen, *How Children Learn,* (New York: McGraw Hill Book Co., 1957), p. 74.

[17] *Ibid.,* p 75.

[18] *Ibid.,* p. 76.

[19] *Ibid.,* pp. 77-79.

[20] Tyler, *loc. cit.*

[21] Tyler, *op. cit.,* pp. 228-229.

Implications for Science Education

It is common sense that academic learning cannot be postponed until the time of maximum learning efficiency. Age 6 may not be the time when science learning proceeds most rapidly, but a start must be made. The science educator must plan a programme so that by the time adulthood is reached, the maximum amount of learning will have taken place. To do this one must begin as early as possible using science curriculum materials that can be understood by the child and progressing to increasing degrees of complexity at a rate commensurate with the mental development of the child.

Furthermore, if "educational readiness" is taken into consideration, science teachers will have to make practical judgments about when to introduce new concepts or material. This means that every science teacher will need to have a thorough knowledge of the subject and considerable ability in ascertaining the readiness of each student to undertake new learning. This will necessitate grouping and much individualized instruction so that new materials are presented in such a way that the child will be able to cope with it. Thus, while teaching elementary science much emphasis should be laid on the physical and natural sciences concerning the environment.

Our present system of grade placement of students, although based to an extent on the idea of maturation level, in effect hinders the application of what might be learned from research. Chronological age and mental age do not always correspond, and thus many students who are taught in the same class by the same methods and using the same instructional material are either not ready to understand the material or are ready to advance to more complex forms of learning but are prevented from doing so by their grade placement.

Thus, if learning is geared to the maturation level, desirable outcomes should result. Satisfaction will come from success and interest will increase. Because of the success, the learner will become more self-confident and attack with greater effectiveness a wide variety of problems.

II

RETENTION AND FORGETTING

Generalization 1: Repetition beyond the criterion of initial correctness is necessary to ensure maximum retention of materials learned.

Benton J Underwood states in the *Scientific American* that the "ultimate degree of learning rather than the rate of learning is the critical factor in forgetting."[22] Many studies have indicated that one of the basic aims of education, retention, is aided by over-learning.

Much of the interest in forgetting and retention shown by researchers in this century was inspired by the work of the German, Ebbinghaus.[23] He found that a series of syllables which were learned twice faded away more slowly than those that were learned only once. The more often they were repeated the less easily they were forgotten. Kreuger[24] used a list of 12 monosyllabic nouns on a memory drum to find whether increased learning was proportional to retention. He concluded that "a certain degree of over-learning, at least 50 per cent, is highly economical from the standpoint of retention for intervals of 2 to 28 days, and the larger the interval the greater the economy."[25]

Klausmeier and Check,[26] however, put little faith in trying to draw conclusions for understanding retention of classroom learning from the learning of meaningless syllables. It may be well, therefore to cite experiments conducted under classroom conditions.

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[22] Benton, J. Underwood, "Forgetting", *Scientific American*, CCX, (March, 1964), p. 92.

[23] Hermann Ebbinghaus, *Memory A Contribution to Experimental Psychology*, Trans. by H.A. Ruger and C E. Bussenius, (New York: Dover Publications inc., 1964), p. 81.

[24] W.C Kreuger. "The Effect of Overlearning on Retention," *Journal of Experimental Psychology*, XII, (December, 1929), p. 78.

[25] *Ibid.*, p. 71.

[26] H.J. Klausmeier, J. Check, "Retention and Transfer in Children of Low, Average and High Intelligence," *Journal of Educational Research*, LV, (April, 1962), 319-322.

Spitzer[27] made a study of the effect of recall tests on retention. He found that they were an effective method of aiding retention since the students reviewed the material learned. Raffell[28] studied the effect of recall on learning words by college students. She found that retention tests given at spaced intervals acted as re-learning devices and were superior to other schedules of testing.

Other investigations have attempted to ascertain the effect of reviews on retention. Peterson[29] and others investigated the effect of review of historical materials on retention in college classes. One review group showed a superiority of 57 per cent over the control group. Tiedman[30] found that the retention of material learned in the classroom was significantly benefitted by review tests.

Implications for Science Education

Science teachers for many years have been familiar with the fact that one of the best ways to prevent subsequent forgetting is to provide for over-learning. But mere repetition does not guarantee that what is to be learned will be more easily retained. To make Johnny repeat 100 times any scientific principle does not guarantee that he has learned. In fact, it may well work the other way. The repetition or review must be meaningful to the child and he must want to retain. The science teacher, therefore, should devise methods that will keep the review from merely taking the form of drill or rote learning. This can be done in numerous ways. A student may learn a concept in science but instead of his repeating it over and over it would be well to utilize the skill in the solution of problems in a large number of different circumstances so that ample opportunity is provided for over-learning. Recall tests, reviews and exercises can be used frequently and varied frequently to save the learner from becoming bored, and yet providing for over-learning.

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[27] H.F. Spitzer, "Studies in Retention," *Journal of Educational Psychology*, XXX, (December, 1939), p. 655.

[28] G. Raffel, "The Effect of Recall on Forgetting," *Journal of Experimental Psychology*, XVI, (December, 1934), 828-838.

[29] H.A. Peterson, M. Ellis, N. Tohill, P. Kloess, "Some Measurements of the Effects of Reviews," *Journal of Educational Psychology*, XXV, (1935), 65-72.

[30] H.R. Tiedman, "A Study in the Retention of Classroom Learning," *Journal of Educational Research*, XLI, (March, 1948), pp. 516-531.

> *Generalization* 2: If there is a failure of recall, it is probably because of the interference coming from subsequent new learning. However, subsequent new learning need not necessarily mean that there will be a failure in recall.

There has been a considerable amount of research done on "interference theory" or "retroactive inhibition." Since there are numerous variables to be considered in experiments on retractive inhibition and forgetting, most of the investigators consider one or more of these variables as part of their study. Mordock[31] has demonstrated that interference among verbal lists can be shown with chains as short as three verbal items if a learner is instructed to count backwards by three's from some given number. McGeoch and McGeoch[32] found that retroactive inhibition was partly a function of the number of repetitions of interpolated lists. The same authors[33] also found the synonymity between the members of the original and interpolated lists to be a highly favourable condition for the production of retroactive inhibition, and hence forgetting. Melton and Irwin[34] have found that using 5, 10, 20, and 40 trials for the interpolated learning following the original learning of 18 nonsense syllables, the greatest retroactive inhibition occurred after ten trial interpolations, and the least for five. In another experiment, Melton and Lackum[35] demonstrated that part of the total interference must be attributed to factors other than competition at the point of recall. They identified another factor as the unlearning of the original response.

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[31] B.B. Mordock, "The Retention of Individual Items", *Journal of Experimental Psychology*, LXII, (1961), 618-625.

[32] J.A. McGeoch, G. McGeoch, "The Influence of Degree of Interpolated Learning on Retroactive Inhibition," *American Journal of Psychology*, XLIV, (1932), 695-708.

[33] McGeoch, "Studies in Retroactive Inhibition, VI: The Influence of the Relative Serial Positions of Interpolated Synonyms," *Journal of Experimental Psychology*, XIX, (1936), 1-23.

[34] A.W. Melton, J.M. Irwin, "The Influence of Degree of Interpolated Learning on Retroactive Inhibition and the Overt Transfer of Specific Responses," *American Journal of Psychology*, LIII, (1940), 173-203.

[35] A.W. Melton, W.J. Lackum, "Retroactive and Proactive Inhibition in Retention: Evidence For A Two Factor Theory of Retroactive Inhibition," *American Journal of Psychology*, LIV, (1941), 157-173.

Osgood, in one study, agreed that interference was because of forgetting but denied that the general belief that "the greater the similarity the greater the retroactive interference" has general validity.[86] This however, as Bugelski[87] points out, may be because the problem of defining "similarity" has never been solved satisfactorily.

Implications for Science Education

One of the obvious conclusions one could draw from the research evidence is that if a new scientific principle interferes with old learning and causes a failure of recall, then there is little point in learning things that will interfere. But the old saying "the more I learn the more I forget" is not entirely true; this can be overcome in a number of ways.

One of the ways to overcome interference is to over-learn the material to be learned and, as already pointed out, make it more resistant to forgetting. If a science teacher is aware of the fact of interference, he can make sure that material is thoroughly learned before new learning is introduced.

Another way of combating retroactive inhibition is for the science teacher to be constantly teaching science with discrimination in mind. For example, the present writer has found it worthwhile to help students distinguish thoroughly between some of the similar scientific concepts.

It has also been shown by research that if the material is meaningful to the learner it is less easily forgotten and less easily interfered with. Science teachers, therefore, should attempt to make the learning experiences of the student as meaningful as possible through careful motivation and application to real life.

Thus the teaching of science has a number of purposes to achieve if it is to merit a place in the school curriculum.

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[86] C.E. Osgood, "An Investigation into the Cause of Retroactive Interference," *Journal of Psychology,* XXXVIII, (1948), 132-154

[87] B.R. Bugelski, *The Psychology of Learning,* (New York: Henry Holt & Co., 1956), o. 321.

> It should carry young people farther along in their understanding of selected generalized concepts, the methods of science, and the social implication of science. It should develop an appreciation of the role of science in advancing man's understanding and control of the world of nature. It should develop a disposition to use the knowledge and methods of science whenever appropriate. It should develop abilities that make young people increasingly independent investigators and learners."[38]

III

Transfer of Training

Generalization 1: The greatest degree of transfer occurs in the learning of principles and generalizations that have many applications rather than isolated learning of facts.

The theory of transfer emphasizing the importance of grasping broad meaning and principles and of organizing and generalizing one's particular experiences has been sponsored chiefly by Charles H. Judd and his followers. He found in his classic experiment using boys trying to hit an under-water target that theory with practice is a great asset.[39] The classic experiment of Judd was to some extent redone by Hendrdickson and Schroeder[40] who concluded that transfer was likely to be most effective when based on a grasp of common principles, formulas or rules. Bagley[41] reports in *The Educative Process* that in one experiment where a teacher emphasized neatness in arithmetic only and not in other subjects no transfer occurred. This same experiment was done by Reudiger[42] with the variation that the teacher stressed neatness as an ideal to be used at home and school, the result was that students exhibited greater neatness in all school subjects.

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[38] Robert H. Carleton, Improving Secondary School Science from *Rethinking Science Education,* The 59th yearbook of the National Society of Education, Part I, University of Chicago, 1960

[39] Frandsen, *op. cit.*, pp. 185-187.

[40] *Ibid.,* p. 186.

[41] H. Woodrow, "The Effect of Type of Training Upon Transference," *Journal of Educational Psychology,* XVIII, (1927), 159-171.

[42] W.C. Reudiger, "Indirect Improvement of Mental Functions through Ideals," *Education Review,* XXXVI, (1908), 364-371.

Research studies show that there is considerable transfer value in instructing towards generalizing and the formulation of various principles or rules. Overman,[43] for instance, found significant gains in arithmetic for the group that had been instructed in generalizing over the group that had practice only. Breed[44] found that rationalization and generalization was even useful for transfer in teaching spelling. Olander[45] showed that learning more isolated facts did not facilitate transfer. He found that in teaching a group 200 number combinations there was no more transfer than for the group that studied only 110 combinations.

Implications for Science Education

Research evidence points to the advantage of formulating operational definitions, principles or rules. The more broadly based the definition, principle or rule, the better will be its chances of transfer to new and different situations. Accordingly, the usefulness of any principle, etc., will be increased if it is practised in as wide variety of circumstances as possible.

Provision needs to be made by the teacher to encourage the student to apply learned principles widely and in as great a variety of situations as possible. If, for instance, the science teacher was teaching the principle of the "balance of nature" it would be well to introduce living examples into the classroom or perhaps to go on a field trip and observe firsthand. If the teacher gives guidance in the application of principles the more able student will probably be able to find a wide variety of applications on his own. For the less able student such guidance may result in some specific rules of thumb such as "It is deeper than it looks" whereas the general principle may not have registered at all.

It is only those principles or generalizations that are adequately grasped, that are likely to prove useful in transfer. For this reason more transfer may be obtained from a simple inelegant rule, which a pupil grasps, rather than a complicated definition that he can repeat but does not understand. Science teachers should be careful to take into account the intellectual level of the students since it is obvious that the brighter student will be able to handle more theoretical principles and ideas than the less able who will only become confused with complicated terminology.

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[43] J.R. Overman, "An Experimental Study of the Effect of the Method of Instruction on Transfer of Training in Arithmetic," *Elementary School Journal,* XXXI, (1930), 183-190.

[44] F.S. Breed, "Generalization in Spelling," *Elementary School Journal,* XXXVII, (1937), 733-741.

[45] H.T. Olander "Transfer of Training in Simple Addition and Subtraction," *Elementary School Journal,* XXXI, (1931), 427-437.

> *Generalization* 2: The learning of principles and generalizations results in the emergence of a "learning set" which, in effect, permits the learner to go on to the next learning step and thus facilitates transfer.

"Learning set" has been defined by Gagne as "knowledge relevant to any given final task to be learned" or a "set of subordinate capabilities."[46] A considerable amount of Gagne's research was aimed at a study of "learning sets" and transfer of training. In one of his experiments using ninth-grade algebra students, he found that success at higher levels was dependent upon the attainment of learning sets at the next lower level.[47]

It has been shown by several investigators that it is possible to develop a general "set" towards learning which results in learning how to learn. This has been shown quite dramatically by Harlow and Warren[48] in their experiment with a monkey learning to solve a series of mechanical puzzles. After much trouble with the first task the monkey developed a general approach or "set" that assisted him to learn succeeding similar tasks much more quickly. Reed,[49] using college students as subjects, found in his experiment that the group of students who had included in their preparation for the task a set to employ meaningful concepts learned the tasks more efficiently than the group not thus prepared. Siegel and Siegel,[50] in a recent experiment, made a strong case for altering the educational set in a conceptual direction.

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[46] Tyler, *op. cit.*, pp. 230-231.

[47] Tyler, *op. cit.*, p. 231.

[48] Stephens, *op. cit.*, p. 215.

[49] H.B. Reed, "Factors Influencing Learning and Retention of Concepts, I. The Influence of Set," *Journal of Experimental Psychology,* XXXVI, (1946), 71-87.

[50] L. Siegel, L. Siegel, "Education Set: A Determinant of Acquisition," *Journal of Educational Psychology,* LVI, (February, 1965), 1-12.

Implications for Science Education

The results of the experiments cited indicate the necessity of building "learning sets" in students so that learned knowledge will have the greatest possible transfer. This can be done in a number of ways. The science teacher should teach his students to be alert for the application of principles learned. The student should be taught to tackle new problems without any hesitation. A general habit should be developed, which has often been rewarded, of looking for further applications of principles and generalizations. It follows that such a habit will develop best in an integrated curriculum arranged in sequences and with provision for the application of old and new principles continuously. If, for instance, the student has been taught in science to make generalizations from being taught critical thinking, the history teacher could apply these generalizations by having his students analyse editorials, newspaper articles, etc., in current events. Gradually the student should come to make applications of his own. In other words, he will have learned how to learn.

Experiments have indicated that the emergence of a "learning set" cannot be left to chance. By suitable sequential arrangements of curriculum content, by methods of teaching which encourage student initiative and by frequent reinforcement for applying previously learned scientific principles to new problelms, the teacher will be able to guide his students to continue to transfer the learning done in the classroom to the problems they face outside. This is one of the ultimate aims of science education.

In conclusion, these generalizations regarding the learning processes rather than being new theories are really examples of teaching techniques that many good and experienced science teachers already practise. These learning processes do not place more demands on a teacher's most precious commodity—time—but permit a teacher to promote the greatest possible amount of learning by his students in the shortest possible time.

Furthermore, these generalizations take full account of the individuality of each student and provide an atmosphere in which creativity can flourish

BIBLIOGRAPHY

Books

Bruner, J.S. *The Process of Education.* New York: Random House. 1960.

Bugelski, B.R. *The Psychology of Learning.* New York: Henry Holt & Co., 1956.

Ebbinghaus, H. *Memory.* Trans. by Henry A. Ruger and Clara E. Bussenius. New York: Dover Publications, 1964.

Frandsen, A.N. *How Children Learn.* New York: McGraw Hill, 1957.

Gagne, Robert M. *The Conditions of Learning.* New York: Holt Rinehart Co., 1965.

Hilgard, Ernest R. (ed). *Theories of Learning And Instruction.* The Sixty-Third Yearbook of the National Society for the Study of Education, Part I Chicago: University of Chicago Press, 1964.

Stephens, John M. *The Psychology of Classroom Learning.* New York: Holt, Rinehart and Winston, 1965.

Symonds, P.M. *What Education has to Learn from Psychology,* Bureau of Publications, Teachers College, Columbia University, 1964.

Periodicals

Book, W.F., L. Norvelle. "An Experimental Study of Learning Incentives," *Pedagogical Seminary,* XXIX (December, 1922), 305-362.

Breed, F.S. "Generalization in Spelling," *Elementary School Journal,* XXXVII, (1931), 427-437

Fay, P.J. "The Effect of the Knowledge of Results On Subsequent Achievement of College Students," *Journal of Educational Psychology,* XXVIII, (October, 1937), 548-554.

Fitch, W.L., and others. "Frequent Testing as a Motivating Factor in Large Lecture Classes," *Journal of Educational Psychology,* XLII (January, 1951), 1-20.

Hertzberger, O.E. and others. "The Value of Objective Tests as Teaching Devices," *Journal of Educational Psychology,* XXIII, (May, 1932), 371-380.

Klausmeier, H.J "Retention and Transfer in Children of Low, Average and High Intelligence," *Journal of Educational Research,* LV, (April, 1962), 319-322.

Kreuger, W.C. "The Effect of Overlearning on Retention," *Journal of Experimental Psychology,* XXX, (December, 1929), 71-78.

Kulp, D.H. "Weekly Tests for Graduate Students?" *School and Society*, XXXVIII, (July, 1933), 157-159.

McGeoch, J.A., G. McGeoch. "The Influence of the Degree of Interpolated Learning upon Retroactive Inhibition," *American Journal of Psychology*, XLIV, (1932), 695-708.

McGeoch, "Studies In Retroactive Inhibition, VI, The Influence of the Relative Serial Positions of Interpolated Synonyms," *Journal of Experimental Psychology*, XI, (1936), 1-23.

Melton, A.W., J.M. Irwin. The Influence of the Degree of Interpolated Learning on Retroactive Inhibition and the Overt Transfer of Specific Responses," *American Journal of Psychology*, LIII, (1940), 173-203.

Melton, A.W., W.J. Lackum. "Retroactive and Proactive Inhibition in Retention: Evidence for a Two Factor Theory," *American Journal of Psychology*, LIV, (1941), 157-173.

Murdock, B.B. "The Retention of Individual Items," *Journal of Experimental Psychology*, LXII, (1961), 618-625.

Noll, V.H. "The Effect of Written Tests upon Achievement in College Courses: An Experiment and Summary of Evidence," *Journal of Educational Research*, XXXII, (January, 1939), 345-358.

Olander, T.T. "Transfer of Training in Simple Addition and Subtraction," *Elementary School Journal*, XXXI, (1931), 427-437.

Osgood, C.E. "An Investigation into the Cause of Retroactive Interference," *Journal of Psychology*, XXXVIII, (1948), 132-154

Overman, J.R. "An Experimental Study of the Effect of the Method of Instruction on Transfer of Training in Arithmetic." *Elementary School Journal*, XXXI, (1930), 183-190.

Peterson, H.A. and others. "Some Measurements of the Effects of Reviews," *Journal of Educational Psychology*, XXV, (1935), 65-72.

Raffel, G. "The Effect of Recall on Forgetting," *Journal of Experimental Psychology*, XVI, (December, 1934), 828-838.

Reed, H.B. "Factors Influencing the Learning and Retention of Concepts, I: The Influence of Set," *Journal of Experimental Psychology*, XXXVI, (1946), 71-78.

Reudiger, W.C. "Indirect Improvement of Mental Functions through Ideals," *Education Review*, XXXVI, (1908), 364-371.

Ross, C.C. "The Influence upon Achievement of a Knowledge of Progress," *Journal of Educational Psychology*, XXIV, (October, 1933), 609-619.

Siegel, L., L. Siegel. "Educational Set: A Determinant of Acquisition," *Journal of Educational Psychology*, LVI, (February, 1965), 1-12.

Spitzer, H.F. "Studies in Retention," *Journal of Educational Psychology*, XXX, (December, 1939), 641-656.

Standlee, L.W., W. Popham. "Quizzes Contribution to Learning," *Journal of Educational Psychology*, LI, (December, 1960), 322-325.

Tiedman, H.R. "A Study in Retention of Classroom Learning," *Journal of Educational Research*, LI,, (March, 1948), 516-531

Underwood, B. "Forgetting," *Scientific American*, CCX, (March, 1964), 92-98.

Van Ormer, E.B. "Retention after Intervals of Sleep and Waking," *Psychological Bulletin*, XXX, (1933), 415-439

Woodrow, H. "The Effect of Type of Training upon Transference," *Journal of Educational Psychology*, XVIII, (1927), 159-171.

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An Empirical Validation of Taxonomy of Educational Objectives Using McQuitty's Hierarchical Syndrome Analysis

A. C. Pachaury

In this study intercorrelations obtained on eight sub-tests and a total test on a population of fourth, fifth and sixth grade children were subjected to McQuitty's Hierarchical Syndrome Analysis to verify the hierarchical and cumulative character of Taxonomy of Educational Objectives: Cognitive Domain. The results in general support the cumulatively hierarchical structure of the Taxonomy, but not unanimously as in some earlier studies.

The assumption underlying the Taxonomy of Educational Objectives: Cognitive Domain (Bloom, *et al.*, 1956), is that the cognitive abilities can be arranged in a hierarchical order. "Knowledge" is the lowest level and "Evaluation" is the highest level, intervened by "Comprehension," "Application," "Analysis," and "Synthesis" respectively.

> Our attempt to arrange educational behaviors from simple to complex was based on the idea that a particular simple behavior may become integrated with other equally simple behaviors to form a more complex behavior. Thus our classification may be said to be

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study.

> in the form where behaviors of the type A form one class, behaviors of type AB form another class, while behaviors of type ABC form still another class. If there is the real order from simple to complex, it should be related to an order of difficulty such that problems requiring behavior A alone should be answered correctly more frequently than problems requiring AB.... Our evidence on this is not entirely satisfactory, but there is an unmistakable trend pointing toward a hierarchy of classes of behavior which is in accordance with our present tentative classification of these behaviors. (Bloom, 1956, pp. 15-19.)

This means that taxonomy is cumulatively hierarchical (Kropp and Stoker, 1966, p. 12).

Graphically this can be represented as follows:

Category	*Abilities*
Knowledge	a
Comprehension	a+b
Application	a+b+c
Analysis	a+b+c+d
Synthesis	a+b+c+d+e
Evaluation	a+b+c+d+e+f

This suggests that correlation between successive categories of the toxonomy should be high than between non-successive pairs of categories. Secondly, the correlation should fall as the successiveness between the categories widens.

Related Studies

Three categories of related studies are reported in the literature Classifications of items by judges and test banks are outside the scope of the present study. The third category of studies relate to 'Statistical Analysis of Taxonomy'-type data.

Dunn and Turner (1959) used physics content for a taxonomy-type test. The cognitive categories used in this study were Knowledge, Application and Understanding. The Knowledge and Application categories were the same as named in Bloom's Taxonomy. The sub-tests of Understanding embraced the other four categories of the Taxonomy. Significant correlations are reported between these categories.

McGurie (1963) investigated the intercorrelation of taxonomic levels in the field of medical studies and found a transcendence of levels of the Taxonomy.

Anderson (1964) used chemistry content to make a taxonomy-type test, based on the first four cognitive categories. Factor analysis of the pre-and post-test resulted into two clusters: Knowledge and Comprehension, and Application and Analysis.

Smith (1965) examined the scalability of the Knowledge and Comprehension levels of the Taxonomy. The intercorrelation matrix of Knowledge and Comprehension sub-level scores failed to form a simplex (Guttman, 1954). Thus the hypothesis of a hierarchical structure of the sub-levels of the first two categories was rejected. However, he obtained a positive low inter-item correlation in the three sub-levels of comprehension category. He further writes that this might be due to chance.

Thomas (1965) studied the first three categories of the Taxonomy. Guttman's simplex analysis was used to verify the cumulativeness of the categories. She reports that the three categories showed the general pattern of a simplex.

Kropp and Stoker (1966) used all the six categories of the Taxonomy. The hypothesis of inverse relationship of mean performance and taxonomic categories were generally supported.

Smith (1968) used Kropp and Stoker's (1966) data and subjected the intercorrelations to the Hierarchical Syndrome Analysis of McQuitty (1966). This study in general supported the cumulative and hierarchical character of the Taxonomy.

Method of This Study

In this study use is made of McQuitty's (1960) Hierarchical Syndrome Analysis, to verify the cumulative and hierarchical character of the Taxonomy.

According to Smith (1968):

> Hierarchical classification by reciprocal pairs is a statistical method of classifying people, institutions or other elements into a hierarchical system based on indicies of association between them. . . .Hierarchical classification is designed to improve and purify data as it proceeds; each successive category is intended to become a better representative of a type as it exists in theory. The method involves the selection of pairs of objects which are indicative of types, i.e.,

> have common characteristics. It then expands and improves the type of incorporating additional objects and eliminating characteristics which are irrelevant to the description of types.

Data

The data analysed in this study is taken from Dr. Helgeson's work (*The Relationships between Concepts of Force Attained and Maturity as Indicated by Grade Levels,* Centre for Cognitive Learning, the University of Wisconsin, Madison, Wisconsin, Technical Report No.43, March 1968, and *Lesson Plans and Tests of Knowledge, Comprehension and Application for Instruction in Concepts of Force, Grades -26,* Practical Paper No. 4, March 1968).

> This study was designed to determine the relative levels of understanding of selected concepts from within the conceptual scheme—force—achieved by pupils in Grades 2 through 6 as indicated by scores on, Knowledge, Comprehension and Application type tests when all receive comparable instruction. (Helgeson, 1968, p. xiii, Technical Report No 43).
>
> Instruments of the paper-and-pencil multiple response type were developed for the use in measuring learner's achievement in understanding each of the 8 concepts. The items were designed for use in testing achievement at the Knowldege, Comprehension and Application levels. The design of the instrument made it necessary for the pupils to select the one best response from among the four possible alternatives. The instrument included 15 items per concept, five items were devoted to each of the Knowldege, Comprehension and Application levels Comprehension and Application type items all inclued the use of diagram to aid in establishing conditions dissimilar from instructional sequence (Helgeson, 1968, Practical Paper No. 4, p. vii).

Intercorrelations of sub-tests were subjected to Hierarchical Syndrome Analysis (McQuitty, 1966), highest pair version.

Support for the Taxonomy rationale would be possible if the graph resulting from the analysis were to reveal only one reciprocal pair represented by the highest correlation in the matrix. This reciprocal pair should then be joined in turn by the adjacent Taxonomy subtests (Smith, 1968).

Results

Nine graphs were drawn for each grade level (4 to 6), one on each of the eight concepts taught to each grade level and one combined graph for all tests for each grade level. Three types of graphs were obtained.

1. Knowledge and Comprehension pair
2. Comprehension and Application pair
3. Knowledge and Application pair.

Table 1 reveals that of 24 graphs, 9 graphs were of Type One. In each case Knowledge and Comprehension sub-tests formed the reciprocal pair with a correlation ranging from 0.18 to 0.75. The reciprocal pair was next joined in each case by the Application sub-tests with relational indices ranging between 0.0 to 0.51.

Three graphs were of Type Two. In each of these cases Comprehension and Application sub-tests formed the reciprocal pair with a correlation ranging from 0.42 to 0.65. The reciprocal pair was next joined to Knowledge sub-tests with a relational indices ranging from 0.3 to 0.13.

The remaining 12 graphs were of Type Three. In each of these cases Knowledge and Application sub-tests formed the reciprocal pair with a correlation ranging from 0.42 to 0.67. The reciprocal pair was next joined to Comprehension sub-tests with relational indices ranging from 0.1 to 0.46.

Table 2 reveals that total test graphs for all grades were of Type One. In each case Knowledge and Comprehension sub-tests formed the reciprocal pair with a correlation ranging from 0.73 to 0.83 The correlation index is quite satisfactory (Guilford, 1950, p. 165). The reciprocal pair in each case is joined by Application sub-tests with relational indices ranging between 0.53 to 0.77.

Discussion

The results of this study are closely parallel to those of Smith's (1968) study, who used Kropp and Stoker's data. In Smith's findings in six of the sixteen matrices the initial reciprocal pair consisted of Evaluation and Application sub-tests. Thus Knowledge and Evaluation categories were generally found to reflect inconsistency as theoretically conceived. In this study, in 12 of the 27 matrices the initial reciprocal pairs consisted of the Knowledge and Comprehension sub-tests (cor-

TABLE 1

Graph Patterns (Individual Tests)*

GRADE	KNOWLEDGE-COMPREHENSION			COMPREHENSION-APPLICATION			KNOWLEDGE-APPLICATION		
	No. of Tests	*Correlation Index*	*Relational Index with Application*	*No. of Tests*	*Correlation Index*	*Relational Index with Knowledge*	*No of Tests*	*Correlation Index*	*Relational Index with Comprehension*
4	Four	(77), (59), (68) & (23) (23 to 77)	(31), (19), (31) & (0) (0 to 31)	One	(45)	(13)	Three	(44), (51) & (49) (44 to 49)	(15), (1) & (4) (1 to 15)
5	Three	(18), (31) & (70) (18 to 70)	(12), (61) & (9) (6 to 12)	One	(65)	(3)	Four	(42), (56) (45) & (59) (42 to 59)	(8), (15) (22) & (2) (2 to 22)
6	Two	(69) & (75) (69 to 75)	(51), (0) (0 to 51)	One	(42)	(4)	Five	(60), (64) (60), (67) & (50) (50 to 67)	(1), (35), (46), (22) & (3) (1 to 46)
		(18 to 75)	(0 to 51)		(42 to 65)	(3 to 13)		(42 to 67)	(1 to 46)
Total Tests	Nine			Three			Twelve		

* Decimals omitted

TABLE 2

Graph Patterns (Total Tests)*

Grade	*Knowledge-Comprehension*	*Comprehension-Application*	*Knowledge-Application*	*Relational Index with Application*
4	(73)	—	—	(53)
5	(70)	—	—	(53)
6	(83)	—	—	(77)
	(70 to 83)			(53 to 77)

*Decimals omitted

relation ranging from 0.73 to 0.83). Inconsistency is shown by some individual tests at grade levels, but if all test matrices are taken into account separately for each grade level, we clearly get reciprocal pair of Knowledge and Comprehension sub-tests (See Table 2). Inconsistency shown by the individual tests may be because of the different difficulty values of individual test-items of sub-tests. But whatever may be the cause of this, the total test for each grade level gives a better picture of the hierarchy than individual sub-tests at each grade level. The results of the present study in general support the cumulatively hierarchical structure of the Taxonomy, but not unanimously as do earlier studies (Thomas, 1965; Kropp and Stoker, 1966; Smith, 1968).

REFERENCES

Anderson, June S. "A Comparative Study of Chemical Educational Study and Traditional Chemistry in terms of Students' Ability to Use Selected Cognitive Processes." Unpublished doctoral dissertation, Florida State University, 1964.

Bloom, B. S. (Ed.) *Taxonomy of Educational Objectives, Hand Book-I: Cogniture Domain,* New York: David McKay and Co., 1956.

Dlunn, S.S., and Turner, M. *ACER Prematriculation Physics Examination,* Report No. 2 Victoria: Australian Council for Educational Research, 1959.

Guilford. J. P. *Fundamental Statistics in Psychology and Education* (Second Edition). New York: McGraw-Hill Book Co., Inc., 1950.

Guttman, L. "A New Approach to Factor Analysis: The Radex". In Lazarsfield, P. (Ed.), *Mathematical Thiking in the Social Sciences.* Glancoe, Illinois: The Free Press, 1954

Helgeson, Stanley L. "The rleationship between concepts of force attained and maturity as indicated by grade levels." Centre for Cogniture Learning, The University of Wisconsin, Madison, Wisconsin, Technical Report No. 43, March, 1968.

Kropp. R P., and H. W. Stoker. "The Construction and Validation of Tests of the Cognition Processes as described in the Taxonomy of Educational Objectives." Cooperative Research Project No. 2117, U S. Office of Education, 1966.

'Lesson Plans and Tests of Knowledge, Comprehension and Application for Instruction in Concepts and Force, Grades 2-6." Practical Paper No. 4, March 1968.

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Volume 6, Number 2, July 1971

McGurie, C. "Research in the Process of Approach to the Construction and Analysis of Medical Examination," National Council on Measurement in Education Year Book, 20, 7-16, 1963.

McQuitty, L. L. "Hierarchical Syndrome Analysis" *Educational and Psychological Measurement,* 20, 293-303, 1960.

"Improved Hierarchical Syndrome Analysis of Discrete and Continuous Data". *Educational and Psychological Measurement,* 26, 577-582, 1966.

Smith, A. B. "An Analysis of the Scalability of the Knowledge and Comprehension levels of the Taxonomy of Educational Objectives: Cognitive Domain". Paper read at American Educational Research Association, Chicago, February 1965

Smith R B. "An Epirical Examination of the Assumptions underlying the Taxonomy of Educational Objectives: Cognitive Domain." *Journal of Educational Measurement,* 5, 2, Summer 1968.

Thomas, Alice M. "Levels of Cognitive Behavior Measured in a Controlled Teaching Situation." Unpublished master's thesis, Cornell University, 1965.

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Motivation Courses and College Students

J. M. Heredero, S. J.

The author reports and discusses results of short motivation courses given to Gujarat college students at camps organized during 1968 and 1969. He compares the results achieved with those achieved in similar courses organized elsewhere separately by NCERT and the SIET Institute of Hyderabad, and stresses the need for more such courses for a wider range of participants.

Education and National Development is the subtitle of the Kothari Commission's Report. Indeed, one of the main aims of the report is to "re-evaluate the role of education in the total programme of national development." As the report has pointed out, "economic growth is not merely a matter of physical resources or of training skilled workers; it needs the education of the whole population in new ways of life, thought and work".

Clear though these objectives are, their implementation is not easy. In this context the pioneering work of David C. McClelland and coworkers on Achievement Motivation seems to be particularly relevant. The Kothari Report speaks of the development of human resources as a more important task than that of physical resources because "the realization of the country's aspirations involves changes in the knowledge, skills, interests and values of the people as a whole." The Achievement Motivation theory seems to point a way to accomplish this monumental task.

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In *The Achieving Society* (McClelland, 1961), McClelland proposed the hypothesis that achievement motive is the mainspring of entrepreneurial activity which fosters the economic development of a society. *A Theory of Achievement Motivation* (Eds. Atkinson and Feather, 1966) presents a theory of achievement motivation and the studies which so far had provided the main body of evidence concerning the validity of its behavioural implications.

The social implications of this theory were soon realised by the exponents of the theory themselves. "If there is one thing that all this research has taught me, it is that men can shape their own destiny, that external difficulties and pressures are not nearly so important in shaping history as some people have argued."[1] McClelland went further and designed a course to heighten the need for achievement based on a theory of motive acquisition which he explains in the article "Towards a Theory of Motive Acquisition" published in the *American Psychologist.*[2] A description of the courses given and research done on them can be found in *Motivating Economic Achievement* (McClelland and Winter, 1969). This book argues that traditional values are not so important in blocking change as currently believed and that economic change can be stimulated by psychological education.

In India the courses were given to potential entrepreneurs of South India. Similar courses were organized by Prayag Mehta at the National Council of Educational Research and Training, New Delhi. Mehta's main field of work was with school teachers and students. His work and research is analysed in *The Achievement Motive in High School Boys* (Mehta, 1969) which also contains the findings of his research with high school students in Delhi.

In Gujarat similar studies have been carried out at the M. B. Patel College of Education, Vallabh Vidyanagar, by a team of research workers with Dolatbhai Desai as the Chief Investigator. A partial study of their work has been published in a special issue of *Nutan Shikshan* (November 1970).

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[1] D.C. McClelland, *The Roots of Consciousness,* p. 44.

[2] McClelland, 1965, 20, 321-333.

Training for Achievement Motivation and Leadership

Heredero (1968) describes an adaptation of similar courses for college and university students. The main objective of these courses remains to heighten the achievement movitation of the students. However, over and above the psychological inputs usually given in McClelland's courses, other inputs are added, mainly of a spiritual type, in an effort to integrate cultural and religious values of the past with modern values, making them relevant in an economic progressive society.

This paper is a study of the data collected while giving these courses during 1968 and 1969; it is an analysis of the values and motives of the participants and the changes effected in them after a four-day course in psychological education.

The main tools used for this research are the following: (1) Scores of TAT stories written at the beginning and end of the Camps. (2) Allport, Vernon and Lindzey's Study of Values: a questionnaire administered during the Camp. (3) A daily evaluation of the day's work.

During the years 1968 and 1969, 135 students participated in these Camps. They came from various colleges and universities as shown in Table 1.

TABLE 1

List of Colleges from which Participants were Recruited

Law Colleges	1. L.A. Shah Law College, Ahmedabad	2
	2. New Law College, Ahmedabad	2
	3. City Law College, Ahmedabad	1
	4. M.P. Shah Law College, Surendranagar	1
Commerce Colleges	1. H.L. College of Commerce, Ahmedabad	12
	2. Vivekanand Commerce College, Ahmedabad	1
	3. City Commerce College, Ahmedabad	1
	4. M.P. Shah Commerce College, Surendranagar	1
	5. B.V.D. Commerce College, Ahmedabad	1
	6. Motilal Commerce College, Ahmedabad	1
	7. M.R. Arts & Commerce College, Rajpipla	1
	8. Commerce College, Junagadh	1
	9. Commerce Faculty, M.S. Univ., Baroda	1
	10. P.D.M. College of Commerce, Rajkot	1
Engineering	1. L.D. Engineering College, Ahmedabad	1
	2. Faculty of Engineering, M.S. Univ., Baroda	4

Medical	1. B.J. Medical College, Ahmedabad	5
Arts	1. St. Xavier's College, Ahmedabad	18
	2. H.K. Arts College, Ahmedabad	3
	3. M.B. College, Dehgam	1
	4. Bhavan's College, Ahmedabad	1
	5. Navgujarat College, Ahmedabad	1
	6. J.J. Arts College, Nadiad	1
	7. Borsad Arts College, Borsad	1
	8. M.B. Shah Arts College, Surendranagar	1
Science	1. Bhavan's College, Ahmedabad	1
	2. St Xavier's College, Ahmedabad	52
	3. B.G.J. College, Cambay	2
	4. M.B. Patel College, Nadiad	1
Post-Graduate	1. Faculty of Education, Vidyanagar	1
	2. Fuculty of Education, M.S. Univ., Baroda	2
	3. School of Social Sciences, Gujarat Univ.	3
	4. School of Architecture, M.S. Univ., Baroda	1
	5. Divinity School, De Nobili College, Poona	1
External Students and Others		7
	Total	135

The Allport-Vernon-Lindzey Study of Values

This study of values is a questionnaire. The answers to it show one's own preferences—or values. Six values are studied: (1) Theoretical, (2) Economical, (3) Aesthetic, (4) Social, (5) Political, and (6) Religious. The maximum score any of these values could possibly get would be 70 and the minimum would be 10. The number of students who have answered this questionnaire is 136—equally divided between 1968 and 1969.

Table 2 gives the preferences of the various Camps for these six values. For easier reference the table just mentions which value was noted first, second, etc. The first striking thing in Table 2 is that Religious Values are consistently the lowest.

It is to be noticed that twice the Religious Value comes either first or second. Both these Camps were exclusively composed of Jesuit Fathers under training. The fact that they are men dedicated to God and whose main work is therefore religious explains their preference.

TABLE 2

Preferences Shown by Ten Different Camps during 1968 and 1969 to Six Different Values

Camps : 1969 No. of participants	1 11	2 16	3 14	4 12	5 15	pts	rank
Values							
Theoretical	5	2	4	3	1	15	3
Economical	1	1	1	6	3	12	2
Aesthetic	3	6	5	4	5	23	5
Social	2	4	3	1	2	12	2
Political	4	3	2	5	4	18	4
Religious	6	5	6	2	6	25	6
Camps: 1968 No. of participants	1 13	2 14	3 13	4 13	5 15		
Values							
Theoretical	4	2	5	3	1	17	4
Economical	3	4	2	2	2	13	3
Aesthetic	5	6	6	3	5	25	6
Social	1	1	1	1	4	8	1
Political	1	3	2	2	2	10	2
Religious	6	4	1	6	6	23	5

Another striking feature of Table 2 is that the 1969 Camps show a marked preference for Economic Values. In fact, if we suppress Camp 4 (which as noted earlier was made up of Jesuits) with its 6th preference for Economic and 1st for Social Values, we would have the result that Economic Values come first during 1969 unlike 1968 where they come third.

TABLE 3

Mean, Median and Standard Deviation of Value Scores : 10 Camps

1968	1			2			3			4			5		
N.SS.	13			14			13			13			15		
	$\bar{X}$	Md	SD	$\bar{X}$	Md	SD	$\bar{X}$	Md	SD	$\bar{X}$	Md	SD	$\bar{X}$	Md	SD
The.	41	43	6.9	42	40	5.2	38	36	6.4	39	38	3.6	45	47	6.5
Eco.	42	43	6.5	37	38	10.3	39	37	8.4	41	41	8·5	44	47	7.1
Aest.	36	36	7.7	36	38	6.9	36	37	10	39	40	5.6	34	33	5.6
Soc.	44	45	4.2	47	46	5.1	44	41	5.3	45	44	7.1	41	41	6.4
Pol.	44	46	5	41	41	4.2	39	39	6 3	41	40	5.9	44	43	5.9
Rel.	33	32	8 9	37	37	8.2	44	44	5.3	35	35	10	32	32	7.8
1969 :	1			2			3			4			5		
	11			16			14			12			15		

	$\bar{X}$	Md	Sd	$\bar{X}$	Md	SD	$\bar{X}$	Md	SD	$\bar{X}$	Md	SD	$\bar{X}$	Md	SD
The.	37	39	3.2	43	43	7.2	40	41	7.3	41	39	6.3	46	46	6.7
Eco.	43	44	9.5	43	41	6.3	46	43	10.8	37	36	6.2	41	43	6.9
Aest.	41	41	7.5	36	36	7.5	39	40	3.3	37	36	6	34	33	7
Soc.	42	39	6	40	40	8.3	41	41	7	*43*	41	6.5	*43*	43	4.7
Pol.	40	41	6	41	42	4.5	42	40	7.4	*37*	37	6.9	39	40	5.4
Rel.	37	38	11.5	36	38	5.9	32	31	8.1	43	43	5.2	34	35	5.5

On the other hand, we see that in the 1968 Camps, except for one—not the Jesuit this time, who are now with the majority—all the others give their first preference to Social Values. It is interesting to note, however, that the standard deviation of Economic Values is always high. This questionnaire seems to tell us that the proverbial interest in economic matters of the people in Gujarat varies more from person to person than the stereotype would make us believe and that, but for the very high scoring of some individuals in Economic Values, Social Values are more consistently preferred by our participants. Table 3 also indicates that another value where the standard deviation is very high is the Religious one. It is true that Religious Values come usually the last. But here again the divergence of opinion is very great.

TABLE 3A

High and Low Scores : 10 Camps

	Theoretical		Economic		Aesthetic		Social		Political		Religious	
	Low	*High*	*Low*	*High*	*Low*	*High*	*Low*	*High*	*Low*	*High*	*Low*	*High*
1968												
1	6	1	2	3	2	6	0	11	2	5	6	1
2	5	2	10	0	2	4	0	16	2	1	4	2
3	10	0	7	2	5	3	0	10	8	2	0	7
4	8	0	3	3	1	6	0	13	2	6	4	4
5	2	6	3	6	2	2	1	8	3	6	10	1
1969												
1	7	0	5	4	1	7	0	7	5	1	7	3
2	7	2	3	4	4	2	4	11	3	4	4	2
3	10	1	3	11	0	4	3	8	4	4	11	1
4	9	1	10	1	1	3	2	6	7	1	0	7
5	2	6	6	3	3	3	0	10	9	1	6	1
	66	19	52	37	21	40	10	100	45	31	52	29

Comparing these figures with those published in the *Manual Study of Values* we see that our averages are the same as those of American college males with one exception, that of Social Values. The average for college males in the U.S.A. oscillates between 32 and 42. While in our Camps the figures are much higher: 40-47 which is much closer to the figures of the American college females: 37-47. We should note here that in the *Study of Values* it is the altruistic or philanthropic aspect of love that is measured. "The Social man prizes other persons as ends, and is therefore himself kind, sympathetic, and unselfish. He is likely to find the theoretical, economic, and aesthetic attitudes cold and inhuman."[3]

A score on one of the values may be considered definitely high or low if it exceeds the range of 50 per cent of all male scores on that value in the study carried out by Allport, Vernon and Lindzey.[4] A score is considered very distinctive if it falls outside the range of 82 per cent of all male scores. The figures given by Allport, *et. al.*, refer to American college students. If all the high and lows are given one mark and those outstandingly high or low are given two marks, we shall have the results shown in Table 3A.

As expected the number of highs in social values outweighs the lows by 10 to 1. More unexpectedly, however, the number of highs in aesthetic values is double that of the lows. In all other values it is the lows which have the upper hand. This was to be expected in religious values; but it comes as a surprise in economic values. (It is true, however, that if the scores of the Jesuit participants are excluded the number of lows comes down to 45 only.) More discouraging is the fact that in theoretical values the number of participants (all college students) who score low, is very great indeed. To summarise, the tendency of our participants is to score higher than the American counterparts in social and aesthetic values and to score less in theoretical, economic and political values. They have one point in common: both of them are less attracted towards religious values. This, of course, indicates a tendency on the results of which no scientific conclusions can be based. For, as said earlier, ours and the American averages are the same except for the scores of social values.

A further point of interest from the above table is that the majority of students participating in the Camps were from Ahmedabad (109) while the rest came from various parts of Gujarat.

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[3] *Manual Study of Values*, p.5.

[4] Figures given in *Manual Study of Values*, p.25.

The TAT Tests

Since the Camps were motivation courses it is natural that much attention was paid to the result of the TAT tests.

TABLE 4

Response Elicited by the Various Pictures (Six Camps)

Picture	Achievement		Affiliation		Power	
	Bef.	*Aft.*	*Bef.*	*Aft.*	*Bef.*	*Aft*
1.	−24	238	63	58	88	72
2.	37	278	54	46	7	7
3.	4	167	32	19	101	119
4.	50	278	19	20	12	11
5.	−21	202	80	90	51	34
6.	24	195	41	20	19	36

The pictures used for the tests are six. The first one shows an elderly khadi-clad person talking to a fashionable young man. In the background a picture of Mahatma Gandhi can be seen. The second picture depicts a young man at his study table. The third portrays a group of young people in a meeting. One is seen leaving the scene. The fourth is a picture of an office where only one man is seen working at his table. All the other desks are unmanned. The fifth picture shows a person in the thirties with a young boy in the fields. In the sixth picture an elderly person appears sitting down in a plane with a book in his hands. The response elicited by the various pictures is shown in Table 4.

Let us now turn to the result of the tests.

Out of the 135 participants only 119 have written the stories at the beginning and end of the Camp. We shall take these 119 only into consideration.

And, first, let us see how they have fared in the first test which is given immediately on arrival. Table 5 gives us the frequency distribution of N Ach. scores.

TABLE 5

N Ach	*X*	*F*	*cum F*	*% F*	*Cum % F*
-7—3	-5	53	53	44.52	44.52
-2—2	0	44	97	37	81.52
3—7	5	9	106	7.56	89.08
8—12	10	9	115	7.56	96.64
13—17	15	2	117	1.68	98.32
18—22	20	0			
23—27	25	2	119	1.68	100.00

Mean = 0.07 Median = -1.77 SD = 5.9

If we compare this table with Table 3.2 in Prayag Mehta's book[5] we shall have the following table:

TABLE 6

Frequency Distribution of N Ach Scores of Delhi School Boys

N Ach	*X*	*F*	*% F*	*Cum. %*
-7—3	-5	21	2.15	2.15
-2—2	0	191	19.60	21.74
3—7	5	319	32.71	54.46
8—12	10	279	28.61	83.08
13—17	15	121	12.42	95.49
18—22	20	39	4.00	99.49
23—27	25	3	0.30	99.79
28—32	30	2	0.20	100.00

"The mean N Ach score was 7.14, the median, 7.00 and the SD 5.96."[6] If we compare this with the scores of our participants we have the fact that the mean N Ach score was 0.07, the Median 1.77 and the SD 5.9. The number of subjects in Prayag Mehta's research reached the 975 mark. We have so far administered the tests to 119. Theirs was a more systematic method taking samples from various schools in Delhi. Our courses are given to people who ask to join our Camps, which are advertised in the local papers and on some of the city colleges notice boards.

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[5] *The Achievement Motive in High School Boys.* National Council of Educational Research and Training, New Delhi, 1969, p 37.
[6] *Ibid.*

But for all this one has to recognize that our participants have fared much worse than the Delhi school boys in the N Ach scores. In other words, they seem to be far less achievement motivated than the school boys in the capital.

What is the impact of the Camps on the participants? The duration of our Camps is of three or four days only. Do such short courses have any effect on the student? Table 7 gives us an answer to this question.

TABLE 7

Mean, Median and Standard Deviation of N Ach Scores Before and After the Courses

1968 Camps	*Mean*		*Median*		SD	*No. of Sc.*
1.	1.2		-1		7.2	14
	17.3	16	17	18	9	
2.	-2.5		-2.5		2.5	13
	14	16	13	17	7.5	
3.	2		3		6.3	12
	16	14	19	13.5	7.3	
4.	-.4		-2		5.1	14
	18.6	19	18	20	9.0	
1969 Camps						
1.	1.63		-1		6.2	11
	11.81	10.1	12	8	7.9	
2.	-2.35		-1.5		2.6	14
	11.8	13.1	10	14.5	8.7	
3.	-.57		-1.5		4	14
	13	13.5	14	10.5	8-6	
4.	-2.16		-5		5.3	12
	14.75	16.9	12	15.5	7.8	
5.	-.73		-4		8.1	15
	9.06	9.8	11	10	7.0	

In it we see that the average increase during the 1968 year was 16. This increase does not compare very favourably say with the average increase of the courses given to teachers of Rajasthan by Prayag Mehta. Their average increase was 26. But then, theirs was "a ten-day course planned for a small group of selected secondary school teachers."[7] Our courses, on the other hand, are open to any student from any college or university who desires to attend them Besides, financial considerations make us limit our courses to a maximum of four days. Still, the fact that the initial score, on an average was only 0.3 could mean that it was easier for our participants to show a greater increase. We can also compare our courses with those conducted by the SIET Institute of Hyderabad and described by D. C. McClelland and David G. Winter.[8] The course was given to 49 middle-class persons from the towns of Rajahmundry, Kakinada and Vellore in South India. The increase seems to be 23. Again these courses lasted for ten days.

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[7] *Ibid.* p. 159.

The length of the courses is of great importance. It takes time to break the ice, to form a group, to overcome personal difficulties which stand in the way of behavioural change. The choice of participants is also important. In 1967, 12 participants were selected out of about 60 applications. The selection was made from among those who scored highest in N Ach. The average score of those selected was 5.92. The Camp lasted four days as usual and yet the average increase was 23.3. This seems to indicate that it is easier to increase the need for achievement of those with an initial higher N Ach score. Therefore, the low initial score of 1968 participants is not necessarily an advantage. However, one cannot push this argument too far. It is clear from Table 7 that there is no correlation between the initial score and the second one.

No mention has been made, so far, of the scores of 1969. Even to a casual observer it is apparent that these are lower than those of the previous year. Both the average and the medium N Ach scores show an appreciable decrease.

Tables 8 and 9 show that the highest average score goes to affiliation, although the difference between affiliation and power is not great, and affiliation has a tendency to decrease noticeably while the difference in power is very small indeed.

If affiliation corresponds roughly to social values as defined by Allport-Vernon-Lindzey one should welcome this decrease in affiliation. Because in the *Study on Values* the highest score goes to social values with a wide margin over the second best—economic values.

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[8] *Motivating Economic Achievement,* The Free Press, New York: 1969.

TABLE 8

Average Affiliation, Power and N Ach Scores Before and After

	CAMPS, 1968	a. 23 Aug.		b. 28 Oct.		c. 3 Nov.		d. 6 Nov.	
Motive Achievement	Bef.	1.2		-2.5		2		-.4	
	Aft.	17.3	16	14	16.5	16	14	18.6	19
Affiliation	Bef.	4.5		3 5		4.2		4.3	
	Aft.	2.2	-2.3	3	-.5	3	-1.2	3.8	-.5
Power	Bef.	2		3.7		3		5	
	Aft.	2 6	.6	4.3	.6	2.2	-.8	4	-1
	CAMPS, 1969	1 Jan.		August		27 Oct.		12 Nov.	28 Dec.
Motive Achievement	Bef.	1.63		-2·35		-.57		-2.16	-.73
	Aft.	11.81	*10.1*	13.00	*15.3*	13.92	*14.5*	14.75 *16.9*	9.06 *9.8*
Affiliation	Bef.	3.63		3.21		4.92		2.66	3.66
	Aft.	3.09	-.54	2.49	-.72	4.07	-.85	1.25 -1.4	2.66 -1.4
Power	Bef.	5.72		4.57		4.71		2.08	2.2
	Aft.	5.81	.09	2.71	-1.8	3.85	-.86	2.16 .08	2.8 .6

TABLE 9

Mean of Achievement, Affiliation and Power Scores Before and After the Courses

	Achievement	Affiliation	Power
Bef.	0.07	3.85	3.71
Aft.	14.24	2.79	3.36

Daily Evaluation

It consists of a very short questionnaire in which we ask the participants to rate on a scale of 1 to 9: (a) how they felt in the group, (b) how was their participation, (c) how much they learnt, (d) the usefulness of the course, (e) how much the group helped them to learn. The second part of the questionnaire consists of five questions: 1. What did you like best? 2 What did you dislike most? 3. Did you feel free to express yourself? If not, why? 4. What factors tended to hinder the participation of others? 5. Any other remarks.

TABLE 10

Average Ratings of Daily Evaluation—First Part

CAMPS	(A)	(B)	(C)	(D)	(E)
1968					
1.	7.6	7.3	7.5	7.3	5.9
2.	8.3	7.3	7.7	8.2	7.5
3.	7.7	7 6	7.3	7.5	7.2
4.	7.5	7.9	7.1	8	6.9
5.	7.9	7.4	7.2	8	6.3
Grand Average	7.8	7.5	7.3	7.8	6.7
1969					
1.	8.4	8.6	7	7.9	6.9
2.	7.8	7.5	6 7	7 6	7
3	7.4	7.2	6.6	7.6	6.9
4.	7.5	7.1	6.4	7.5	6.8
5.	8.1	7.4	6.4	7.2	5.4
Grand Average	7.8	7.5	6.6	7.5	6.6

Table 10 shows the average score of the various Camps. The normal duration of the courses is four days. Hence this questionnaire is administered four times. It has been a matter of great satisfaction to see how highly the majority of the participants rate the usefulness of the course—on occasions reaching an average of 8.9 on the last day of the course. If we remember that the highest mark anyone can get is nine, and that the figures given are the average of the four days one cannot but feel encouraged.

One notices, though, a downward trend, however gradual it may be, during 1969. This trend becomes all the more significant if we compare it with the results of the TAT tests, where the increase in N Ach scores was also significantly lower in 1969 than in the previous year. As the instructors grow accustomed to the course and become self-complacent they lose the anxiety caused by the newness of the venture. And a certain amount of anxiety is necessary to bring out the best one has in himself. Fortunately, this disease has a remedy. The results of the two years have shaken off that complacency. These data were processed during May. A study of the same was made during July and August. Before the August courses a meeting of the staff was held and these results discussed. The average increase in the Achievement Motivation score in the subsequent course was 16.11 for the group of 11 boys and 25.38 for the group of 16 girls. The average increase of 25 was the highest reached thus far.

TABLE 11

Activities Liked Best by the Participants

CAMPS 1968	1	2	3	4	5	Total	1969					
							1	2	3	4	5	Total
1. Lecture	13	8	12	13	14	60	19	42	24	19	19	123
2. Practical	9	11	8	7	25	60	22	22	15	11	14	84
3. Prayer	7	2	—	4	2	15	25	19	18	—*	9	71
4. Discussion	3	18	7	8	12	48	16	18	25	1	27	87
5. General Meeting							—	1	—	6	1	8
6. All activities	3	1	—	2	1	7	—	3	10	—	1	14
7. Other	—	—	3	—	—	3	—	—	—	1	—	1
8. None	—	—	—	—	1	1	—	—	—	—	—	0
9. No answer	3	1	6	2	2	14	—	—	—	—	2	2

*We did not have prayer meetings.

Tables 11 and 12 show that the participants still have a liking for lectures. But what is really striking is that there is not a single entry against Prayer Meetings and that its popularity has greatly increased during 1969. This is all the more striking if we remember that religious values have the lowest score of all the six values. One of the explanations for this preference for Prayer Meetings may be explained by the fact that that the votes were given by those in the group whose score was high in religious values. This interpretation seems to be confirmed by the fact that the Camp which has the highest number of preferences for Prayer Meetings (25) (Ist Camp 1969) is also the Camp with the highest standard deviation in Religiour Values: 11.5. And, indeed, in that Camp there are four people whose first preference is for Religious Values. The score of the rest is either very near the average of 37 or well below it. If these four people gave every day their first preference to the Prayer Meeting we should have a total of 16. There remain nine first preferences to be explained. Moreover, not a single person has said even once that he has disliked the Prayer Meeting (see Table 11). Again, if we examine the answers given to the fifth question (Any other comments ?) we shall see that they can be catalogued into 64 various

TABLE 12

Activities Disliked by the Participants

CAMPS	1968						1969					
	1	2	3	4	5	Total	1	2	3	4	5	Total
1. Lecture	1	—	12	3	7	23	—	—	2	6	3	11
2. Practical	1	—	3	3	1	8	—	3	—	2	—	5
3. Prayer	—	—	—	—	—	0	—	—	—	—	—	0
4. Discussion	2	8	1	2	4	29	3	5	1	5	5	19
5. General Meeting	—	—	—	—	—	0	—	—	—	—	—	0
6. All activities												
7. Other	4	10	2	2	—	18	11	15	16	—	21	63
8. None	—	—	—	—	—	0	—	13	4	6	2	25
9. No answer	26	13	11	19	31	100	30	23	33	17	28	131

headings ranging from complaints about the food to a request to have the Camp prolonged. Among these suggestions there are requests to have more Prayer Meetings (8 times during 1968-69); but there is not a single complaint against them.

In Conclusion

This study is incomplete from two points of view. To complete it there is need to study how lasting these effects have been on the participants. Some advance camps should be arranged and the same tests administered. It is also incomplete from another point of view. The nature of these courses demands that goals be set up. This task has been particularly difficult with students. The students participating in these courses are by and large hard-working. For some time an attempt was made to have extra-curricular activities which would make the participants social-minded. It was even thought of setting up an Association. All these efforts have proved largely a failure, the main reason being that by the time they get organized the examinations are too near. The preparation for these examinations absorbs the students so much that no energy is left for any other activity.

This state of affairs moved the instructors of these courses to seek another type of participant where the follow-up work could be more easy. A programme has now been started for village farmers. This scheme has the added advantage that there are a number of agencies ready to subsidise this type of activity. This has allowed the organisers to have a ten-day course as a pilot project. The success of the same has prompted other voluntary agencies to offer them similar projects.

A drawback of these 'mini-courses' for students is that too much has to be compressed into too short a time. There is an element of shock treatment in this approach and, as such, it has certain advantages and certain disadvantages. The great advantage is the high degree of involvement it elicits on the part of the participants. It also gives them the taste of how much a person can do when the activities of the day are properly planned. The disadvantage of this procedure however, is that little time is left for informal conversations and personal counselling. Again, there is hardly any leisure for people to read and ponder about the activities and experiences of the day. These courses open new vistas to the participants, new ideas are proposed to them. However, it takes time for ideas to sink in. More time should be given to think about them and to talk them over with others.

But for all this there is no doubt that the Camps do effect behavioural changes. In April 1970, previous participants were invited to take part in an advance camp. There were about 50 applications out of about 100 invitations. The main reason given by them was they had found the previous course very useful, and they expected the advance camp to be more useful still.

One cannot but wish that some of the funds allocated for education should be diverted to schemes of this type. Without subsidy it is impossible to run sufficiently long courses with the required staff. Moreover, the staff requires special training as the classical way of teaching based on direct influence, viz., lecturing, giving direction, criticism, etc., has to give way to indirect influence, viz., accepting feelings, praising and encouraging, accepting and using ideas of the participants, asking them questions.[9] All this requires finance: money to train the staff, money to pay specially trained people—and a sufficient number of them. If funds could be diverted to this type of education there is little doubt that something would be done to make up for the deficiencies of present-day education.

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[9] Cf. N.A. Flanders, *Interaction Analysis in the Classroom. A manual for Observers*, Ann Arbor, University of Michigan, 1966.

BIBLIOGRAPHY AND REFERENCES

Allport, G.W., Vernon, P.E., Lindzey, G. '*Manual Study of Values*, Boston: Houghton Mifflin Co., 1970.

Atkinson. J.W, and Feather, N.T. (Eds.) *A Theory of Achievement Motivation*, New York: John Wiley and Sons, 1966

McClelland, David, G. *The Achieving Society*, N. J.: D. Van Nostrand Co, Princeton, 1967.

——*The Roots of Consciousness*, Princeton, N J.: D. Van Nostrand Co., 1964.

——"Towards a Theory of Motive Acquisition", *American Psychologist*, 1956, 20, 321-333.

——and Winter, D. G. *Motivating Economic Achievement*, New York: The Free Press, 1969

Heredero, J.M., *Training for Achievement Motivation and Leadership*, Delhi: Jesuit Educational Association of India, 4 Rajniwas Marg, 1968.

Mehta, Prayag *The Achievement Motive in High School Boys*, New Delhi: National Council of Educational Research and Training 1969

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Available Technical Potential at the Delta Level

Atmananda Sharma

The author reports a study undertaken mainly to assess the supply of technical potential at the delta level (Class VIII) in the boys' higher secondary schools of Delhi. Other aims were to study the effect of urban and rural environments on the development of technical potential, to determine the loss of this potential through failure to secure technical education, and to diagnose the causes of this loss with a view to remedying them. A major finding is that only 14.55% students are potential material for higher technical education and subsequent technical jobs. The rural contribution is 1.10% in comparison to the urban contribution of 13.45%. The author suggests, among other things, that simple machines, their principles and functions may be taught at the delta level.

Manpower is a nation's most precious and critical resource. This statement emphasises a new understanding of the extent to which the well-being of a developing country, like India, is a function of the qualitative and quantitative characteristics of her human resources and, therefore, of significance of soundly conceived developmental planning which aims at the maximum development of our manpower and of its more effective utilisation.

Problems in Manpower Planning

Manpower planning has around it three interrelated problems. *Firstly,* what is the present supply and what is it like? How many persons are there who are trained as engineers, physical scientists, teachers, doctors, etc.? How rapidly have the specialized groups been growing and how efficiently are they being used? *Secondly,* what are the demands now, and what are they likely to be in future? Are they increasing more rapidly than is the supply? If demands appear to be greater than the supply, how can more youngsters be persuaded to remain until they have acquired the training which will allow them to work effectively at higher specialized levels? *Thirdly,* what is the potential supply? How many youngsters in the schools have the potentiality of becoming trained specialists? How many are lost because they do not secure the necessary education? Why are they lost? Any responsible educational policy will need to be based on a much better knowledge of the size and composition of these reserves of ability than now exists

PURPOSE

The study was conducted with four main aims in view:

1. To assess the supply of technical potential at the delta level (Class VIII) of boys' higher secondary schools of Delhi.
2. To study the effect of urban and rural environments on the development of technical potential.
3. To determine how many potentially fit boys could not secure technical education, and to assess the extent of loss caused thereby.
4. To diagnose the causes of loss with a view to remedying them.

TOOL FOR THE STUDY

The Battery of Mechanical Aptitude Tests[1] consisting of the Mechanical Knowledge Test, Mechanical Comprehension Test, Space

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[1] Sharma, A. *A Battery of Mechanical Aptitude Tests,* Shrimati R.K. Sharma, 26/46, Shakti Nagar, Delhi 7.

Relations Test, Form Relations Test and Mechanical Adaptability Test, was used for conducting the Survey. The 'split-half' reliability of the battery is .98 and the empirical validity ranges between .64 and .72 (criterion being the aggregate of marks in technical subjects—Engineering Drawing, Trade Theory and Workshop) median 'r' with science and arts subjects is .35 and .20 respectively. Thus the battery appeared to discriminate fairly well between the three streams—technical, humanities and science.

The battery consists of 150 items, each sub-test contributing 30 items. The average pass percentage of these items is 46.37 with mode at about 50. The average discrimination is 47.04 (r=.65). The total working time with the battery is 90 minutes.

The Mechanical Knowledge Test measures the knowledge about the use of tools, the purpose for which they are used rather than their names or by whom they are used. It shows practical interest of boys who had no formal practical activities.

The Mechanical Comprehension Test is a test of understanding and application of scientific and mechanical principles. The questions require comprehension of the nature, operation and effects of various physical principles rather than knowledge of specific tools or items of equipment and their uses:

The Space Relations Test measured the factor of spatial visualisation. The test has four sub-parts. The first and second parts measure the ability of recognising an object when it has been rotated in various ways; the third part measures the ability to visualise and count the number of cubes used in making solid objects of different shapes and sizes, and the fourth part requires to conceive an irregular two-dimensional figure as made up of two smaller figures which when put together make a square.

The Form Relations Test attempts to measure perceptual speed and accuracy. Each item is made up of a stem and five possible choices from which to select an answer. The stems are the disarranged parts, from two to five in number, of a geometric figure. The responses are assembled geometric figures, only one of which could be made by putting the parts of the stem figure together.

The Mechanical Adaptability Test is essentially a measure of the individual's background in fields of sciences, scientific applications and related activities.

TECHNICAL POTENTIAL

The word 'potential' means existing in possibility, something which is latent, an undeveloped capacity to acquire ability and skills. To survey technical potential may mean to identify individuals who have potential now, (this is termed as the 'potential in the narrow sense') or it may mean to identify individuals who have potential now and who in addition will, on a subsequent occasion, turn in a talented performance (this is termed as the 'potential in the broad sense'). The former is based on a knowledge of what one *can* do while the latter deals with what one *will* do. For a given population and a given type of training the 'potential in the broad sense' obviously is smaller than the 'potential in the narrow sense' and forms only part of it. Moreover, to have a reliable estimate of technical potential who will pursue technical education and pass higher examinations presents many technical difficulties because success in a public examination is a complex function of many complicated factors—intellectual, emotional and sociological. Vernon writes: "Educational attainments especially when measured by school or other examinations are naturally more complex, and we have already seen that somewhat ill-defined factor of industriousness plus interests, which Alexander calls, X, plays a prominent part."[2] Similar factors called interest, study or 'hale' have been reported in American investigations by Holzinger and Swineford (1939), Sisk (1940), Carrol (1943) and Comery (1949).[3] Obviously reliable methods to measure these complex and ill-defined factors influencing the success of education are not available and at least it is virtually impossible to measure them directly and in advance. Therefore, roundabout ways are usually adopted A very widely advocated method is to divide the populations into a number of social strata because various investigations[4] suggest that there are very large differences in degree of participation of the various social classes in continued education. The differences are, however, so large that other factors of economic and social origin are also at work. Another distribution is the geographical one. Also large differences are often observed in urban and rural areas. Lastly, there are differences in school attendance between the sexes, the quantitative results obtained for the male population, therefore, cannot be simply transferred to the corresponding female groups.

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[2] Vernon, P.E. *Structure of Human Abilities,* Methuen, London, 1961, p. 37.

[3] Wolff, P. De. "Intellectual Resources and the Growth of Higher Education." Report of the Hague Conference on Forecasting Manpower Needs, OSTP, 1959.

[4] Husen, T. *Begavning Och Miljo, Stockholm*, 1951, and *Begaafdheidsondezocken intellegenties preiding: Deel II, Intelligentie Arbeidspotentie Demologisch Instituut,* 1957.

Because of the technical difficulties, lack of data, and changing social and economical conditions owing to the growing economy of the country the 'technical potential in narrow sense' only can be identified on the basis of the distribution of aptitude scores. This knowledge (narow potential as contrasted to broad potential) will be more desirable and useful because at the school-going age children do not attend school and the percentage of children attending school at different levels—primary, elementary and secondary—is different and much less than desired. The estimation of technical potential in the broad sense will be more meaningful when an active educational policy for optimum participation in higher education is started.

Further, the mechanical aptitude battery employed for survey measured technical potential for the three levels of jobs: (a) professional and managerial jobs having independent responsibility, like designers, consulting chiefs, etc., (b) professional and managerial jobs with narrower responsibilities, like engineers, factory managers, etc., and (c) semi-professional and business jobs with low level responsibility for others and which are more concerned with application of policy—chief factory foreman, small factory managers, etc.

The regression equations for predicting aptitude scores from a knowledge of achievement scores Y and Z were worked on the basis of Technical Higher Secondary School, Delhi for Classes IX and X in 1962 and 1963. The equations were:

$$X_1 = 55.23 + .087 \quad Y \text{————} (i)$$
$$X_2 = 65.48 + .068 \quad Z \text{————} (ii)$$

where X_1 and X_2 are the predicted aptitude scores, Y and Z are the obtained achievement scores. Three values of X_1 and X_2 were calculated corresponding to 60 per cent (first division), 48 per cent (second division) and 36 per cent (third division) (or pass) marks obtained in the aggregate which are given below:

X_1 (60)=104.82; X_2 (60)=104.24————(ii)
X_1 (48)= 96.55; X_2 (48)= 97.78————(iii)
X_1 (36)= 88.29; X_2 (36)= 91.32————(iv)

In order to avoid the pitfalls in assuming these cut-off scores as fixed points the confidence bands for each of them were calculated The length of a confidence band is two times the 'standard error of measurement.' The confidence bands for the three scores are given below:

X_1 (60) 103-106————(v)
X_1 (48) 95-98 ————(vi)
X_1 (36) 87-90 ————(vii)

Thus the score 87 was taken to discriminate between the technical potential and the non-potential. The predictive validity of the battery of mechanical aptitude tests was estimated by the cosinepie formula. The obtained value of rt=.67 is statistically highly significant, however, the optimum value of rt (=.85) is given cut-off score 95.

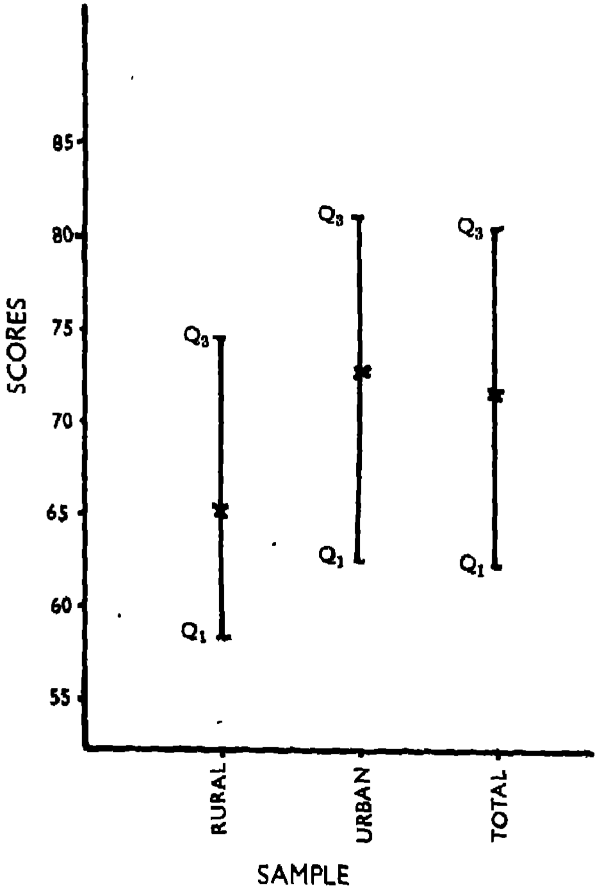
SAMPLE

In 1963-64, Delhi had 152 boys' higher secondary schools situated in the urban area and 36 schools located in the rural area. A 10 per cent random sample consisting of 15 urban and 4 rural schools was drawn by adopting the method suggested by Frank Yates. All the boys reading in Class VIII of a school were included in the sample without any discrimination. The sample consisted of 1093 students of which 934 belonged to urban area and 159 to rural area.

THE MECHANICAL APTITUDE SCORES

The five tests were administered by a qualified tester in the prescribed order, and the detailed written instructions for each test were strictly adhered to. The answer sheets were scored with the help of Rights Keys which were available for each test. The scores for five tests were then combined to give the mechanical aptitude score.

The measures of central tendency and dispersion of the Mechanical Aptitude Test scores are shown in the Table. The variations in Mechanical Aptitude Scores of urban, rural and total samples are graphically shown in the Figure which shows 75th, 50th and 25th percentile values for urban, rural and total sample.



TABLE

Measures of Central Tendency and Dispersion of Mechanical Aptitude Scores

	URBAN	RURAL	TOTAL
N	944	159	1093
Q 3	81.41	73.60	80.73
Mdn	72.08	64.60	71.20
Q 1	63.33	57.85	62.10
Q.D.	9.04	7.88	9.31
Mean	72.97	66.19	71.98
S.D.	13.44	12.96	13.92

RESULT AND THEIR DISCUSSION

Rural and Urban Differences

From the figure it is seen that there was no difference in the spread of scores for urban and rural groups. The critical ratio for significance of difference between standard deviations was also .79 which is lower than 1.96 and was therefore not significant at 5 per cent level. But there was significant difference between mean scores of the two groups. The critial ratio being 6.05, the urban boys were superior to rural boys in mechanical aptitude.

Technical Potential Supply

The cut-off score for distinguishing the potential was seen to be 87. Out of 1093 students 159, that is, 14.55 per cent scored 87 marks or more and thus were potential for higher technical education and thereafter for technical jobs.

The rural contribution to the potential supply is negligible, it being 1.10 per cent (12 students out of 1093) contribution by the urban region.

If the urban and rural samples are considered separately and by themselves then it is noticed that 15.74 per cent (147 out of 934) of the urban school-going population and 7.55 per cent (12 out of 139) of the rural boys studying in the delta class are potential for higher technical education and subsequently for technical jobs.

Estimate of Potential Supply for Delhi

In 1963-64 there were 22,180 students reading in Class VIII of boys' higher secondary schools, both government and recognised, in Delhi. Therefore the technical potential supply can be estimated to be 3227 boys. It would thus appear that if the technical potential is to be fully utilised then there should be a provision for 3227 students to pursue studies in the technical stream at the higher secondary level

Loss of Technical Potential

The technical education in Delhi is provided at three levels

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1. Certificate Course (Junior Technical Education)
2. Diploma Course (Polytechnic Education)
3. Degree Course (University Education)

but no higher secondary school offers facilities for technical education. The number of seats available at the three levels was 480, 660 and 480 respectively.

There is provision for 480 students only in the three junior technical schools, against the potential supply of 3227 students. Thus there is a loss of 2747 students if they are admitted from the available potential.

The admissions to the schools are not made on the basis of aptitude tests; these are made on the basis of marks obtained in Hindi, English and mathematics in the common examination conducted by the Directorate of Education, Delhi Administration. Further, there are good reasons to believe that few persons from the potential supply have been admitted to these schools because of the location of schools and the admission policy. There were as many as 900 applicants for the centrally located junior technical school at Kashmere Gate against its capacity of 120. The Junior Technical School at Khanpur (Okhala) had only few applicants against a capacity of 240. The school at Kashmere Gate did not admit boys who had less than 50 per cent marks in the aggregate in the three subjects mentioned above. While the school at Khanpur admitted students without any restriction and had students with as low a percentage as 30. The third school located at Narela had many seats vacant till 31 August 1964.

Follow-up Study

A follow-up study was taken to ascertain the courses offered in the higher secondary classes by those who were identified as technical potential in this survey. It showed that out of the 159 identified as potential, 68 have taken admission in the science stream, 27 have offered arts subjects, 22 have offered commerce group, 16 failed in Class VIII and were studying again in the same class and 26 left the institutions. Of these 10, who left the institution, three did so for taking science courses. Thus we see that no student indentified as potential offered technical subjects or even strived for admission to technical schools.

Thus in one sense the loss of technical potential is 100 per cent. But if we regard the number offering science courses as no loss at this stage because they may turn to technical courses later on then the loss of potential amounts to 55 per cent (88 out of 159).

The reasons for not offering either the technical or science subjects can be better known only after interviewing the students indentified as potential. It appears, however, that ignorance of aptitudes, lack of information of growing occupations, of the relationship of education to occupations, the parents' wishes, the non-availability of subjects in a particular school or locality may account for the loss.

SUGGESTIONS*

Needs for Changing School Curriculum

The potential capable of profiting from technical education and subsequently entering into technical jobs consists of students identified on the basis of tests. That potential has been estimated rather conservatively for the mechancial aptitude cut-off score of 87, represents relatively a high standard in terms of standard scores it means+1.00. There is another reason for regarding the estimate of the reserve as conservative rather than optimistic. Scores on tests of aptitude do not measure inborn potential. They reflect differences in education and cultural opportunity. It is very evident from the differences in the scores of urban and rural boys. If more children attended school regularly, if they attended school longer, and if the schools they attended were better, that is, provided a rich curriculum suitable for the development of mechanical ability, then more than 14.55 per cent students would develop aptitude equivalent to a score of 87 on the tests. There is thus a hidden reserve of persons whose intellectual potential for advanced training in technical fields has not been adequately developed and the large differences between urban and rural areas point to large reserves in the latter than in the former.

Obviously those who comprise this unidentified potential are not using their ability in acquiring the education needed for technical and engineering work. Their capacities, moreover, have not been developed to the point where they will be revealed by surveys or testing programmes. No one can say with confidence how significant an addition to the number of persons capable of undertaking technical education and training could be obtained by developing this hidden reserve. There are indications, however, that it may be very great. It is, therefore, important that simple machines, their principles and functions be taught in Classes VI, VII and VIII. Moreover the differences in mechanical aptitude scores of urban and rural students can also be narrowed down in this way. The view is supported by recent studies of the performance of Negroes on scholastic aptitude tests. Most social scientists believe that there are no inborn differences between Negroes and the rest of population in America in intellectual potential, or that such differences, if they exist, are negligible.

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*The views are of the author and do not reflect the policy of the Department or the National Council of Educational Research and Training.

Need for Guidance and Counselling

The very fact that none of the students indentified as technical potential in this survey has entered the technical stream or a technical school is an evidence of the general ignorance among youngsters of their special aptitudes and interests and how can they best be developed. The schools have no provision to keep a record of the intelligence, aptitudes, interests, personality traits, etc., of the individual students. The schools do not provide any assistance to a student in developing an adequate concept of himself to know his strengths and his weaknesses.

The students, almost equally their elders and their teachers, are ignorant that as the economy of the country is growing the number of occupations that support it are also growing. They are ignorant of the actual diversity and requirements of an occupation and the growing specialisation of the jobs.

The students do not understand the relationship between education and occupational opportunity. They do not know that their early selection of courses of study restricts their freedom to make subsequent educational and occupational choices. Most of them accept an assigned curriculum in the higher secondary classes as they did in middle or primary classes. It is not only students with limited intellectual ability who act this way even gifted children, as is in the present study, drift along within the school system more or less doing the required work and choosing courses they consider easy or that their friends are taking, or that are available in the school in which they were studying.

It is obviously desirable that some systematic procedure exists through which a student at the delta class is helped to develop an adequate concept of himself, of his ability, aptitude and interests, is informed about the value of education as a whole and the specific usefulness of different parts of the curriculum in terms of his aptitudes and interests, and is made aware of the enlarged opportunities for training or employment.

Method of Admission to Technical Schools

The admissions are generally made with two points in view—firstly, that the academically best students (without any regard to special aptitude) be admitted and secondly, that no seat is left vacant. The result is that many junior technical schools have a very poor stuff in terms of special aptitude and in terms of general scholastic attainments as well. In Delhi the quality of students admitted in Khanpur is inferior than those admitted in Kashmere Gate. At Narela it is the poorest.

Addressing the coordination committee of the All India Council for Technical Education held on 12 January 1963 at Delhi, the Minister of Scientific Research & Cultural Affairs remarked that the wastage in technical education was alarming and indefensible. The wastage in the case of diploma students was 55 per cent in the first two years of the Third Plan and 35 per cent in the case of degree students. In a study of the wastage of certificate student it was noticed that the rate varied at different stages of Junior Technical Schools.[6] At first-year level it was 11.62 per cent and at third-year level it was 54.83 per cent while educational, administrative, socio-economic factors were responsible for some part of this high wastage, the selection of persons with little aptitude for technical work appeared to be a major factor because in degree or diploma courses persons obtaining below 55 per cent marks in the aggregate in the Boards examinations are not admitted.

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[6] Sharma, A. *A Battery of Mechanical Aptitude Tests* (Construction and Standardisation), Unpublished Ph.D. Thesis, Agra University, 1963, pp. 15-18.

Besides the wastage of money and training resources on unsuitable students (in terms of aptitude) there are social aspects of the problem too. It means a frustration for the individual who repeatedly fails and on the other hand the right students who could profit from technical courses is prevented from being admitted as the number of seats available is limited.

Therefore, it appears not only necessary but essential as well that the admission to technical schools should be on the basis of aptitude tests. Experiments in other countries and in our own have shown that mechanical aptitude can be detected and determined by suitable tests to a high degree of reliability and there is no reason why such tests should not be utilised in our country.

Location and Number of Technical Institutions

The location of an institution has a very important bearing on the utilisation of potential. It has been argued and widely accepted that the student should not walk more than a mile from his home for higher secondary education. It is this reason that higher secondary schools are being raised in each locality. Why is the same principle not followed in the case of technical institutions? It is no way economical to open technical institutions for potential belonging to first, second and third levels, at places where they are not be found. The junior technical schools located in the rural areas have been noticed to have very poor quality students.

Similarly it is not economical to open schools for skilled workers in areas where there are no industries. A skilled worker living in Delhi can go to an industry 30-50 miles away from his home but may not prefer to go to Bhilai for a salary of Rs. 100.

It will be worth mentioning that the improvement of curriculum which is likely to raise the percentage of the population with mechanical aptitude would not necessarily result in an increase in the percentage of attending technical institutions. The technical institutions may raise their standard and thus keep the population relatively stable, as it is happening in the universities today, a decade back a person who passed the intermediate examination could be reasonably sure to get admission in the university but today the qualifying marks required for admission are 45 per cent. And more than this, even the aptitude tests might not reveal that the mechanical aptitude of the population had risen for these tests are periodically revised and standardised, the avarage score remains at some arbitrary figure. Scores of such tests reveal how an individual performs compared to others and not how he measures upto some absolute standard. For these and some such other reasons the tangible results of improvement in pre-higher secondary education which would have the effect of increasing the mechanical aptitude of the population might be obscured.

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A Prognostic Study of Achievement in Relation to Academic Adjustment

S. Narayana Rao

In this study the investigator, employing four predictor variables, predicted achievement at graduation for each of 1642 randomly chosen degree class students. Subjects achieving above the predicted level plus one standard error of estimate were identified as overachievers and those achieving below the predicted level less one standard error of estimate were designated as underachievers. The investigator then studied the patterns of academic adjustment of the Ss thus selected, some personality variables, and some of the factors affecting the academic adjustmental patterns of overachievers and underachievers, employing relevant instruments. The results indicate that academic achievement is significantly related to academic adjustment, that the academic adjustment of overachievers is significantly related to the aspects of personality which were studied, and that the academic adjustmental patterns of overachievers and underachievers differ significantly. The study highlights the importance of the need for counselling and guidance for students found to be inappropriately adjusted to the academic situation.

The distressing phenomenon of academic underachievement among able students has been causing serious concern to educationists, teachers, parents and researchers for several decades now. Academic under-achievement, more than academic failure, constitutes a grave problem as it amounts to wastage of human resources which wastage should be construed as an irreparable loss to the society.

Investigations of this problem with a view to discover ways and means to remedy the situation, have been numerous, especially in the United States. Efforts were made by investigators to identify intra-individual and environmental factors in relation to academic performance. They have exploited many techniques, adopted various approaches and studied several variables, in their zeal to find the causes that underlie and factors that lead to academic under-achievement. However, their findings by and large have not been unequivocal. Some seem to stress one or two personality factors, others similarly emphasise a few situational variables but none seem to have fully accounted for the phenomenon. Yet from the welter of these findings one can discern a factor which may be identified as "adjustment to academic work," that is either directly or indirectly found to be operative in precipitating under-achievement in the academic scene. However, it is a moot question whether findings of the several investigations of the problem carried out in the United States and elsewhere would help solve this problem in its Indian context with its unique cultural, social and economic conditions. Would the psychodynamics involved in the two situations be the same ?

Brief Review of the Pertinent Previous Work

Several investigators have found the area of adjustment to college to be of vital importance in academic achievement, As early as 1927, Corson observed that on entering the college, the freshman faces a number of new adjustmental problems for which he is usually unprepared. Congdon (1943), Houston & Marzolf (1944), Hibler & Larson (1944), Carroll & Jones (1944) have all found several adjustmental problems to be associated with under-achievement. Steinzor (1944), Cattell (1945), Thompson (1948) also pointed out that the over-achievers were characterized by good adjustment to school and greater awareness and responsiveness to environmental influences. Johnson (1947), held that poor performance in college was due to unsatisfactory adjustment to college. Stone (1948), located problems in the area of adjustment to college work and found them to rank first in a study of 578 students. Stormwold & Wrenn (1948) observed that a well adjusted student exhibits high intrinsic interest in the subject-matter of study, positive attitude towards the requirements of his curriculum, stability of his goals, balanced emotional life, ability to concentrate for a reasonable length of time on his tasks, and ability to enjoy life in many areas. According to Anderson (1954) many under-achievers were not beset with serious personal problems. Their difficulty seems to lie in an inadequate understanding of the academic challenge coupled with an equally inadequate effort. Horrall (1957) studying students with high intelligence found that those adjudged to have good adjustment tended to be high achievers while those adjudged poorly adjusted to be low achievers. Miller (1937), noticed among other things serious chronic neurotic problems in the case of the non-achievers. Findings of Terman & Oden (1947), Shaw & McCuen (1960), Gallenghar (1964) have emphasized that under-achievement is a continuing problem stemming from basic personality and social problems which needs treatment and care as early in the school programme as is feasible. French (1958), reported that lack of adjustment to college life in the freshman introduces extraneous influences on scholastic success. Christensen (1956) and Pophan & Moore (1960) observed that over-achievers significantly differ from under-achievers with regard to their adjustment to college as assessed by Borow's Inventory. Frankel (1960), found over-achievers to be more adequately adjusted to the academic situation. Roberts (1962) reported significant differences between over-and under-achievers with regard to their scholastic adjustment. Rao (1963, 1967) found academic adjustment to be the greatest single factor that affected student performance.

The all too brief a review of studies, cited above, strongly indicates a relation between achievement and certain personality variables and adjustment—particularly adjustment to the academic situation. Since the educational practices, facilities, goals, etc., in the West and in India glaringly differ, the psychodynamics of adjustment in the two situations with different cultural, social and economic factors could not be the same. Research on under-achievers in Indian context seems to be warranted since almost all of the research reports mentioned pertain to foreign studies carried out under conditions vastly different from our own especially in the field of higher education.

Definition of the Problem

Students with a high or above average ability have frequently been found to make grades far below their capacities, while those with average or near average ability have often been found to achieve a level of performance beyond their capacity. This suggests that high mental ability may neither ensure a high level of achievement nor account for the differences in achievement by itself. Several investigators have pointed to the futility of attempting to explain the differential levels of achievement in terms of ability alone.

Academic achievement, it would be appreciated, is the resultant of the complex patterns of adjustment which determine the efficiency of the individual's pattern of energy utilization. The pattern of adjustment to the academic situation, determines to a large extent the quality and efficiency of academic striving. Thus superior achievement may be looked upon as evidence of successful adjustment as it is the end product of the interplay of a complexity of factors specifically involved in the academic situation. The capacity to meet all the demands in the academic situation or some of them reasonably well, involves aspects of personality like motivation, interests, goals, aspirations; study skills and practices; personal and social adjustment, etc. Two students of about equal ability may be found to differ widely with regard to their achievement. In the absence of significant differences in mental ability, such differences in achievement may perhaps have to be explained in terms of differences in their adjustment to the demands of the academic situation.

The general hypothesis to be tested was that academic achievement would be significantly related to the adjustment to academic work. More specifically, it was hypothesized that the nature of academic adjustment of over-achievers would significantly differ from that of under-achievers.

If the above were demonstrated to be true, what are the factors that contribute to desirable patterns of academic adjustment? Suitable subsidiary hypotheses were set up for examining the relation of academic adjustment to factors such as problems of adjustment, general and academic; neurotic difficulties and anxiety.

Population

The population of the study was male under-graduate students enrolled in the colleges affiliated to S. V. University. Five non-professional colleges and one professional college were selected at random from out of the 32 colleges of the university. From the selected colleges every alternate name from the concerned nominal rolls was chosen.

Identification of Subjects for the Investigation

As a student's academic work obviously depends on the level of his mental ability and verbal ability to some extent, suitable measures of these were obtained. Since what a student is likely to achieve in the near future (within certain limits) may be indicated by what he has achieved in the immediate past, the Pre-University examination performance was selected as a measure of past performance. The student's first term test performance was obtained as it provides a measure of his initial level of performance in a new situation in which he is placed (viz., new course of study, new college, etc,). The above four variables were chosen to predict a student's performance at the graduate level against the criterion of his average achievement in three terminal tests, leaving the first term test apart.

One-fifth of the subjects from the selected students were randomly chosen and a regression equation employing the four predictor variables listed above was derived to predict performance at the end of their respective courses of study.

TABLE 1

Means, SDs and rs of Predictor Variables of Academic Achievement of Students (N=328)

	M	*SD*	*AGP*	*I Term*	*PUC*	*RPM*	*VT*
Average Grade Point (AGP)	9.65	7.62	—	.482	.450	.323	.381
I Term Test Marks	9.17	6.43	—	—	.343	.313	.372
Pre-University Marks (PUC)	13.29	8.12	—	—	—	.361	.530
Raven's Progressive Matrices Test Scores (RPM)	48.94	6.14	—	—	—	—	.274
Verbal Test Score (VT)	32.69	5.96	—	—	—	—	—

TABLE 2

Beta Weights and Regression Equation (N=328)

					M	SD
B 1	·244	Pre-University	b 1	.211	13.29	8,12
B 2	.104	RPM	b 2	.119	48.94	6.14
B 3	.078	Verbal Test	b 3	.092	22.69	5.96
B 4	.337	I Term Marks	b 4	.367	9.17	6.43

$X^1 = .367\ x_1 + .211\ x_2 + .119\ x_3 + .092\ x_4 - 4.41$
where X^1=predicted score x_1=I Term Marks
x_2=Pre-University Marks x_3=RPM Score & x_4=Verbal Test Score
Standard Error of Estimate $\sigma\ 1.2345 = 572$

The actual achievement of the 1642 students was compared with the level of achievement predicted for each one of them. Students who achieved above the level of performance predicted plus one standard error or estimate were identified as Over-achievers (OAs) and those who achieved below the level of achievement predicted for them less one standard error of estimate, were designated as Under-achievers (UAs). This procedure was adopted to eliminate the phenomenon of regression to the centre (Mean) on the part of superior and below average students.

TABLE 3

Population and Subjects of the Investigation

Class	*No. Chosen*	*Over-achievers*	*Under-achievers*
B.A.	686	60	117
B. Sc.	752	98	114
B. E.	204	60	70
Total	1642	218	301

Method

Subjects identified as above (OAs and UAs) were administered the following instruments under normal classroom conditions in groups of 15 to 20;

1. Academic Adjustment Inventory to assess academic adjustment;
2. the S.V.U. Personality Scale to assess neurotic difficulties;

3. a problem check list to identify problems of general and academic nature; and
4. Academic Anxiety Test to assess anxiety of both facilitating and debilitating type.

Discussion of Results

What is the relation of mental ability to achievement? Students of high ability have often been found to make grades incommensurable with their abilities. Such instances are numerous enough to suggest that the mere presence of ability does not ensure success. Several studies, notably those of Rupp & Kirkpatrick, Gunderson, Leonard & Feldt have pointed to the conclusion that the bond between ability and achievement is not strong.

TABLE 4

Analysis of Variance of the Raven's Progressive Matrices Test Scores of Over-and Under-achievers

Source of Variation	*d.f.*	*SS*	*MSS*	*F*
SS_M	1	21.20	21.20	0.565 $P < .05$.
SS_W	517	19392.90	37.50	
SS_T	518	19414.10	—	

From Table 4 it would be seen that the Mean RPM scores of 47.15 and 46.74 of OAs and UAs respectively were not significantly different, $F(1,517) = .565$ $P < .05$. It would be seen that Ss of equal or near-equal ability performed differentially in the academic field. The Chi-square test of independence made to examine the relation between ability and achievement scores yielded a value of 1.0138 for df=2, not significant even at .50 level. The r between RPM and achievement scores was .323.

The obtained results lead to the conclusion that differences in academic achievement are not directly related to differences in mental ability (as assessed by RPM). This finding corroborates those reported elsewhere and in India with similar population groups (Rao, 1963, 1967).

A student of superior ability may have achieved high at the lower levels of education with probably less effort on his part, while a student of comparatively lower ability may have also achieved about equally, largely because of his effort. When the two move into the collegiate situation, the superior student with his 'take-it-easy' attitude and slipshod efforts, irrelevant behaviour and habit formation, achieves marks or grades incommensurate with his ability. The other student with less ability may perhaps achieve a high level of performance largely because of his application and effort. Obviously this situation suggests that a student's academic achievement is a function of his response sets and learning experiences determined by his personality factors, adjustment, motivations, goals, etc.

Considering that a student's performance is a part function of his whole personality, his adjustment, etc., the part played by these non-intellectual factors in achievement appears to assume greater importance at higher levels of education. Superior achievement may be thus related to successful adjustment to the academic situation. In the absence of significant differences in mental ability between OAs and UAs, differences in achievement may have to be explained in terms of differences in their adjustment to the demands of the academic situation. That a student fails to make the grades he is capable of might have for its explanation some upset or undesirable mode of adjustment to the demands of the new environment into which he enters after school.

Students resort to colleges from no common motives and carry dispositions favourable or hostile to satisfactory adjustment. Some are keen and adequately motivated; they are avid of learning and develop sound techniques for acquiring it. They adjust reasonably well to their class-fellows and teachers. Others fare less fortunately. Some become home-sick while a few get themselves wrapped up in difficulties, grow listless, seek various forms of retreat, like wandering, daydreaming, etc. Some try and succeed getting the attention of their fellows and conduct themselves as if they resort to colleges in order to be noticed, to be hoisted into the status of leadership and to be admired. Still others just drift along, letting themselves to be pushed and pulled by adventitious forces. Thus the adjustmental processes and their perversions adopted by students may perhaps hold the key to understanding of the phenomenon of under-achievement.

TABLE 5

Analysis of Variance of Academic Adjustment Scores of Over-and Under-achievers

Source	*d.f.*	*SS*	*MSS*	*F*
SS_M	1	147973.0	147973.0	105.84 P>.01
SS_W	517	72277.4	139.8	
SS_T	518	220250.4		

To examine the relation of academic achievement to academic adjustment, the two groups of Ss were administered the Academic Adjustment Inventory. From Table 5 it would be seen that the OA group significantly differed from the UA group. The Mean academic adjustment scores 185.36 and 151.15 of the OAs and UAs respectively were significantly different, F (1,517) = 105.84 P < .01. The Chi-square test yielded a value of 188.15 for df=4 significant beyond .001 level. The r between achievement and academic adjustment was highly significant. Partialling the influence of ability from the r between achievement and academic adjustment scores while slightly reducing the size of the r, resulted in a significantly large partial r suggesting that achievement and academic adjustment were related independently of ability.

Subjects with superior academic adjustment were found to differ from their under-achieving counterparts with inferior patterns of adjustment with regard to the six aspects of academic adjustment assessed by the instrument (Academic Adjustment Inventory). The Mean scores of the two groups were significantly different.

TABLE 6

Mean Scores on the Different Aspects of Academic Adjustment of Over-and Under-achievers and F-ratios

Aspects of Academic Adjustment	*Over-achievers (N=218)* Mean	*Under-achievers (N=301)* Mean	*F (d.f. 1,597)*
Curricular choice	35.81	29.49	326.56
Maturity of goals	30.59	24.88	210.26
Personal efficiency	27.05	21.60	13.64
Study habits	45.36	36.58	283.42
Motivation and aspiration level	25.18	21.50	123.87
Interpersonal relations with class-fellows and teachers	21.70	17.19	286.58

All F values significant beyond .01 level.

TABLE 7

Chi-square Value of the Test of Independence in Contingency Tables for the Several Variables

S. No	*Between variables*	*N*	*d.f*	X^2	*Significance level*
1.	RPM scores and Achievement	517	2	1.013	—
2.	Academic Adjustment and Achievement	517	4	188.15	.001
3.	Achievement and General Problems	517	16	268.72	.001
4.	Achievement and Academic Problems	517	16	239.81	.001
5.	Academic Adjustment and General Problems	517	6	230.23	.001
6.	Academic Adjustment and Academic Problems	517	6	225.76	.001
7.	Neurotic difficulties and Academic Achievement	517	12	42.65	.001
8.	Neurotic difficulties and Academic Adjustment	517	6	241.67	.001
9.	Anxiety (Facilitating) and Achievement	517	12	90.94	.001
10.	Anxiety (Debilitating) and Achievement	517	12	46.79	.001
11.	Anxiety (Facilitating) academic Adjustment	517	6	43.56	.001
12.	Anxiety (Debilitating) academic Adjustment	517	6	51.64	.001

Ss with higher levels of achievement were found to differ from Ss whose achievement was of a lower order. The OAs were characterized by superior and desirable patterns of adjustment to the academic situation. They have had occasion to weigh the pros and cons of their curricular choices and did not enroll themselves in a mood of resignation and apathy. Even when a few of them were forced to enroll themselves in courses not to their taste at the outset, appeared to have reconciled themselves to the situation and developed a positive relish and applied themselves to the task with the necessary zeal. They did not fret for a long time and resort to undesirable modes of compensatory activities. They had better and more desirable life goals, and worked to realize them with all the power at their command. Their poor-achieving counterparts on the other hand, had no specific goals and appeared to be pushed and pulled by adventitious forces—often resorting to activities essentially unrelated to academic work. Achieving students had better study habits and were characterized by a high degree of intrinsic interest in their academic work, a positive attitude towards the general requirements of the academic situation, a realistic evaluation of their own abilities and capacities and were reasonably motivated.

The adjustmental patterns of poor achievers leave much to be desired. Most of them appeared to be attending colleges as a means of 'doing something'. Their attitude to their problems revealed tendencies such as withdrawal, negativism and indifference. They were easily drawn to several distractions and their aspirational level was not high. Their interpersonal relations with their class-fellows and teachers were generally less satisfactory.

The results obtained in this study amply show that academic achievement is significantly related to academic adjustment. The hypothesis that the two would not be related was rejected on the basis of the results obtained.

The second part of the investigation was to examine the factors that may affect desirable patterns of academic adjustment.

TABLE 8

Analysis of Variance of General Problem Scores of Over-and Under-achiever Groups

Source	*d.f.*	*SS*	*MSS*	*F*
SS_M	1	108650.5	108650.5	479.26 P>.01
SS_W	517	117211.5	226.7	
SS_T	518	225862.0		

TABLE 9

Analysis of Variance of Academic Problem Scores of Over- and Under-achiever Groups

Source	*d.f.*	*SS*	*MSS*	*F*
SS_M	1	19139.4	19139.4	947.49 P>.01
SS_W	517	10456.0	20.2	
SS_T	518	29595.4		

A problem check list was administered to the two groups of *Ss*. The Mean problem scores (General) 28.28 and 35.20 of OAs and UAs respectively were significantly different, F (1,517)=479.26 P 7 .01. Similarly the Mean academic problem scores 6.66 and 18.97 of OAs and UAs were significantly different, F (1, 517)=947.50 P 7 .01. Correlations between problem and achievement scores were –.374 and –.568 for the OAs; and –.341 and –.665 for the UAs. Chi-square analysis yielded values of 268.72 df=16 and 239.81 df=16 for general and academic problems respectively significant beyond .001 level. Partialling the influence of mental ability reduced the r between adjustmental problems and achievement by a very small amount. Partialling the effect of general and academic problems from the r between achievement and academic adjustment revealed striking differences between the two groups. The presence of a large number of problems seems to adversely affect the adjustmental efforts of the Ss. Ss reporting more adjustmental problems either of a general or academic nature made correspondingly poor adjustmental scores. The r between adjustment and problem scores were –.409, –.511 and .126 and .282 for the OA and UA groups respectively. Table 7 shows that X^2 values of 230.23 and 225.76 for df=6 are significant beyond .001 level, suggesting that academic adjustment and problems reported were significantly related in the Ss studied.

TABLE 10

Analysis of Variance of Neurotic Difficulties Scores of Over and Under-achiever Groups

Source	*d.f.*	*SS*	*MSS*	*F*
SS_M	1	52407.97	52407.97	335.004 P>.01
SS_W	517	80880.75	156.44	
SS_T	518	133288.77		

Table 10 shows that the Mean Neurotic difficulties scores of 44.69 and 64.85 of OAs and UAs were significantly different, F (1,517) =335.04 P 7 .01. The *r* between neurotic difficulties and achievement scores were –.398 and –.130 for OAs and UAs respectively. Table 7 gives the chi-square value of 52.645 for df=12 for neurotic difficulties and achievement was significant beyond .001 level. Thus the obtained results show that the presence of neurotic difficulties inter feres with the effective functioning of the *Ss* in the academic situation.

Academic adjustment and neurotic difficulties were also found to be significantly related in the OAs and UAs. Chi-square value of 241.67 df=6 was significant beyond .001 level. The r between academic adjustment and neurotic difficulties were -.228 and -.113 for OAs and UAs respectively. Desirable pattern of academic adjustment was found in Ss reporting fewer neurotic difficulties. The results support the conclusion that academic adjustment was significantly influenced by the presence or otherwise of neurotic problems in the Ss studied.

Anxiety when aroused in an achieving situation is likely to affect performance. Either it might facilitate or debilitate it or may have no appreciable effect on it. As the level of achievement differs in different individuals, anxiety may perhaps be influencing performance and thus may be leading to differential levels of achievement. The *Ss* in this investigation were administered the Achievement Anxiety Test developed on the basis of Alpert and Haber's instrument. The s, viz., the facilitating anxiety scores and the debilitating anxiety score.

TABLE 11

Analysis of Variance of Anxiety (Facilitating) Scores of Over-and Under-achiever Groups

Source	*d.f.*	*SS*	*MSS*	*F*
SS_M	1	25603.20	25603.20	588.53 P>.01
SS_W	517	23826.97	46.08	
SS_T	518	49430.17		

Table 11 presents the results. The Mean facilitating anxiety scores of the two groups 35.42 and 24.53 were significantly different F (1, 517)=588.53 P 7 .01. Similarly the Mean debilitating anxiety scores (Table 12) 20.49 and 31.15 of the OAs and UAs were significantly different, F (1, 517)=731.79 P 7 .01 The Chi-square test of independence of anxiety (facilitating) and achievement yielded a value of 90.94 df=12 significant beyond .001 level. The Chi-square value of 46.70 df=12 for debilitating anxiety and achievement was significant

TABLE 12

Analysis of Variance of Anxiety (Debilitating) Scores of Over- and Under-achiever Groups

Source	*d.f.*	*SS*	*MSS*	*F*
SS_M	1	14369.15	14369.15	731.99 P>.01
SS_W	517	10148.13	19.63	
SS_T	518	24517.28		

beyond .001 level. The rs between the facilitating anxiety and achievement were .327 and –.358 for OAs and UAs respectively and –.286 and .223 for OAs and UAs respectively for the debilitating anxiety scores. The chi-square test of independence of academic adjustment and the two anxiety scores yielded 43.56 df=6 (facilitating) and 51.64 df=6 (debilitating) both the values were significant beyond .001 level. The correlation between anxiety and academic adjustment were .306 and —.234 for OAs and UAs (facilitating) and —.202 and —.357 for OAs and UAs respectively (debilitating).

From the foregoing discussion it would be seen that OAs and UAs significantly differed from each other with regard to their patterns of adjustment to the academic situation. Academic adjustment of OAs was found to be significantly affected by factors such as fewer problems of adjustment of general and academic nature, fewer neurotic difficulties and achievement anxiety of a facilitating type. In contrast to the OAs, the UAs were found to be poorly adjusted to the academic situation, they were plagued by a large number of adjustmental problems of both general and academic nature, had a significantly larger number of neurotic problems and were adversely affected by the presence of the debilitating type of anxiety.

Conclusions

Employing four prediditor variables, achievement at graduation was predicted for all the students chosen for the study. Those achieving above the predicted level plus one standard error of estimate were identified as Over-achievers (OAs) and those achieving below the predicted level less one standard error of estimate were designated as Under-achievers (UAs). These two groups of students

(OAs and UAs) thus selected were the subjects of the investigation proper. The main hypotheses set up for investigation were:

1. that achievement would not be significantly related to academic adjustment; and
2. that academic adjustment of OAs and UAs would be related differentially to certain aspects like problems of adjustment, neurotic difficulties, and anxiety.

From the results obtained in this study, the following conclusions may be drawn:

1. Academic achievement was significantly related to students' adjustment to the academic situation. Over-achiever's pattern of adjustment to the academic situation significantly differed from that of under-achiever's.
2. Academic adjustment of students was significantly related to neurotic difficulties. Subjects having higher scores on neurotic difficulties, tended to be poorly adjusted to the academic situation and performed unsatisfactorily in academic work.
3. Academic adjustment was significantly related to problems of adjustment both of general and academic nature.
4. Academic achievement was related to the arousal of the facilitating type of anxiety while the debilitating type of anxiety had adverse effect on performance.
5. Anxiety of both the facilitating and debilitating types was significantly related to academic adjustment.

The results obtained in this study point to the importance of harmonious pattern of adjustment to the academic situation and work which underlies academic achievement. The over-achievers as a group, significantly differed from the under-achievers with regard to their patterns of adjustment to the academic situation. Over-achievers were better and appropriately motivated to achieve a high level of performance.

It is not unnatural or abnormal to have problems. Successful living consists in meeting the problems of adjustment squarely. Students have their share of problems peculiar to themselves. Some of their problems arise from within themselves—and some emanate from the collegiate situation in which the students find themselves. Many of the problems which arise as a result of natural growth processes necessitate adjustment. These problems concern home, social living, finance, health and emotional needs. They are common problems which confront all youth. In addition, the collegiate student has a few more problems peculiar to the academic situation which have to be boldly faced and satisfactorily resolved by them.

Since academic performance is significantly affected by the nature of adjustment to the academic situation, ways and means have to be found to help students make desirable adjustment to the academic situation. This has a great practical implication from the point of view of the educationist and administrator. Much of the needless educational waste could be avoided by instituting suitable remedial programmes. In this context, paying special attention to secure better academic adjustment on the part of students assumes great significance. This is one of the most promising ways of increasing the efficiency of students and securing to society the enduring values of education.

A significantly large number of problems reported by the under-achievers are in the area of motivation. If academic failure is to be forestalled and standards improved, it is inescapable that colleges and universities should provide relevant values and stimulating academic environments. Students often acquire unworthy and inappropriate values through informal association with undesirable influences of their peer groups. Students, however, could be encouraged to find a member of the faculty with whom they can with facility establish a relaxed intellectual companionship. What is urgently required is the creation of an atmosphere conducive to intellectual excellence and constant vigilance to counter and over-come psychological inertia and growing cynicism in our students during the crucial phase in their development when they stay at the seats of higher learning.

REFERENCES

Anderson, J.R. 'Do college students lack motivation? Or are they motivated to fail?' *Person. & Guid. J.*, 1954, 33, 209-210.

Beasley, J. *Under-achievement: Review of the Literature*, N.Y. Talented Youth Project, H.M.L.I., Teachers College, Columbia Univ., 1957.

Congdon, N.A. The perplexities of college freshmen'. *Educ. Psychol. Measmt.*, 1943, 3, 367-375

Carroll, H.A. and Jones, H M. 'Adjustment problems of college students in a teachers college. *School & Soc.*, 11944, 59, 270-272.

Corson, H.F. 'Factor in the development of psychoses in college men', *Mental Hygiene*, 1927, 11, 498-518.

Cattell, R.B. 'Personality traits associated with abilities II with verbal and mathematical abilities. *J Educ. Psychol.*, 1945, 51, 475-486.

Christensen, C.M. 'A note on Borow's Inventory of Academic Adjustment', *J. Educ. Res.*, 1956, 50, 55-58.

Frankel, E. 'A comparative study of achieving and under-achieving high school boys of higher intellectual ability', *J. Educ. Res.*, 1960, 53, 172-180.

French, J.W. 'Validation of new item types against four years academic criteria, *J. Educ. Psychol.*, 1958, 49, 67-76

Gallenghar, J.T. *Teaching the Gifted Child.* Boston, Allyn & Bacon, 1964.

Garatt, H.E. 'A review and interpretation of factors related to scholastic success in colleges of arts and science and teachers colleges', *J. Exptl. Educ.*, 1949, 28, 91-138.

Hibler, F.W. and Larson, A.H. 'Problems of upper class students in a teachers college', *J. Appl. Psychol.*, 1944, 59, 270-272.

Horrall, B.M. 'Academic performance and personality adjustment of highly intelligent college students', *Genet. Psychol., Monogr.*, 1957, 55, 3.

Houston, W.M. and Marzolf, S.S 'Faculty use of the Problem Check List', *J. Highr. Educ.*, 1944, 15, 325-328

Jensen, V H. 'Influence of personality traits on academic success', *Person. & Guid. J.*, 1958, 36, 497-500.

Miller, A.J. 'Is the exceptionally able college student socially maladjusted?' *School & Soc.*, 1937, 45, 862-864.

Popham, W.J. and Moore, M.R. 'A note on the validity of Borow's Inventory of Academic Adjustment', *J. Educ. Res.*, 1960, 53, 172-180.

Rao, S.N. 'Students' performance in relation to some aspects of Personality and academic adjustment', Ph.D., thesis (Unpublished), S.V. University, 1963.

Rao, S.N. *Students Performance and Adjustment*, 1967, S. V University, Tirupati, S. India.

Roberts, H.E. 'Factors affecting the achievement and under-achievement of bright high school students', *J. Educ. Res.*, 1962, 56, 175-183.

Shaw, M.C. and McCuen, J.T. 'The onset of academic under-achievement', *J. Educ. Psychol.*, 1960, 51, 103-106.

Steinzor, B. 'Rorschach responses of achieving and non-achieving students of high ability, *Amer. J. Orthopsychiat.*, 1944, 14, 494-504.

Stone, L.G. 'Students' problems in a Teachers' College', *J. Educ. Psychol.*, 1948, 39, 404-416.

Stormswold, S.A. and Wrenn, G.G. 'Counselling Students Towards School Adjustment', *Educ. Psychol. Measmt.*, 1948, 8, 57-63.

Terman and Oden. *The Gifted Child Grows Up*, Stanford University Press, Stanford, Calif., 1947.

Thompson, G.M. 'College Grades and Group Rorschach'. *J. Appl.* Psychol., 1948, 32, 398-407.

Ulinger, C.A. and Stephens, M.W. 'Relation of achievement motivation to academic achievement in students of superior ability,' *J. Educ. Psychol.*, 1960, 51, 259-266.

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Relationship between Predictors and Teacher-Effectiveness at Elementary Level

R.A. Sharma

This study was designed to investigate the relationship between certain predictors and teacher-effectiveness at the elementary stage. Six predictors (aptitude, age, academic grades, teaching experience, sex, socio-economic status) and three criterion measures (classroom teaching rating, personality rating, the final marks of the training course) were taken up for study. The main findings are that a significant relationship exists between the criteria of teacher-effectiveness and academic grades and teaching experience as predictors. Socio-economic status and sex variables are not significant.

The following are the main objectives of the present study:

1. To study the relationship between predictors of teacher-effectiveness.
2. To analyse the specific statistical significance of the predictors of teacher-effectiveness.
3. To investigate the specific nature of teacher-effectiveness as predictable from various criteria.
4. To find out the multiple-regression equations for the prediction of teacher-effectiveness on the basis of predictors.

The Hypotheses

Underlying the plan and procedure of the study the following hypotheses have been tested:

1. Teacher-effectiveness is predictable in terms of criteria relating to teaching aptitude.
2. There is a significant relationship between teacher-effectiveness and academic grades in the school final examinations.
3. The sex difference in teacher-effectiveness is not significant in terms of the prevailing conditions for teaching.

Methodology

In the study 700 student-teachers were selected by cluster sampling technique from the elementary teacher-education institutions of U.P. In order to analyse the relationship and criterion measures of teacher-effectiveness at this level, the normative survey method was followed. The observations of the study are based on both cross-sectional and longitudinal approaches.

Procedure

After selection of the sample a teaching aptitude test was administered to the 700 student-teachers of elementary teacher-training institutions of Uttar Pradesh. The Teaching Aptitude Test constructed and standardized by K. P. Pandey was used. Personality rating and class-room teaching rating scales were prepared by the investigator to be used as a tool for obtaining the data for the teacher-effectiveness. These tools were used mainly for follow-up data for the candidates after six months of their training course. The teaching aptitude test was administered in July 1967 and the follow-up tools were used in January 1968.

The obtained data were used to determine the relationship between predictors and criterion measures. The multiple correlation and prediction technique for more than three variables was taken up for treatment of data. Aitken's method[1] of pivotal condensation was used to compute the regression weights, beta coefficients and multiple correlation coefficients for predictors and criterion measures separately.

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[1] George A. Ferguson, *Statistical Analysis in Psychology and Education*, McGraw Hill Book Co., New York, London, 1959, p. 397.

Analysis and Treatment of Data

As mentioned earlier Aitken's method was applied for the solution of regression coefficients and coefficients of multiple correlations for each criterion separately. The obtained results for the three criteria—personality ratings, classroom ratings and the Final Examination marks have been summarized in Table 1.

TABLE 1

Beta Coefficients and Multiple Correlation Coefficients for Personality Ratings, Classroom Rating and Final Examination Marks

Criterion Measures	*Beta Coefficients*					*Multiple Correlation Coefficient*
	Aptitude Test	*Age*	*Acad. Grades*	*Teaching Experience*	*Socio-econ. Status*	*R*
1. Personality rating	-.076	.168	.419	.184	.214	$.448^{++}$
2. Classroom rating	.309	-.026	.076	.136	.055	$.408^{++}$
3. Final Examination marks	.158	-.032	.328	.052	.122	$.454^{++}$

$^{++}$Significant at .01 level of confidence

The table indicates that the highest coefficient of multiple correlation was found to be .454 for Final Examination marks as a criterion measure. The significance of multiple correlation coefficients was tested by computing the F-ratios. The F-ratios for personality rating, classroom rating and Final Examination marks were found to be 34.05, 27.43 and 35.35 respectively, with the degree of freedom (5, 694). These F-values are significant at .01 level of confidence. It is evident that multiple correlation coefficients are highly significant and that they suggest high forms of prediction.

After testing the significance of multiple correlation coefficients, the regression equations were developed by computing the regression weights and constant for each criterion separately. The results of multiple regression equations are given in Table 2.

TABLE 2

Multiple Regression Equation for Predicting the Criteria

Criterion		*Predictors*					*Constant*
		Apt. Test t	*Age* *a*	*Acad. Grade* *g*	*Teach. Exp.* *e*	*Socio-econ. Status* *s*	
1. Personality rating X_p	=	$-.145X_t$	$+ 1.372X_a$	$+9.154X_g$	$+3.61X_e$	$+.054X_s+$	44.62
2. Class room rating X_c	=	$.157X_t$	$- .056X_a$	$+ .430X_g$	$+.708X_e$	$+.004X_s+$	15.17
3. Final Exam. marks. X'_m	=	$.432X_t$	$- .374X_a$	$+10.268X_g$	$+1.46X_e$	$+.044X_s+$	211.97

It may be stated that the multiple regression equation for predicting the personality rating for every unit increases in a, g, and e; Xp which increases 1.372, 9.154, and 3.61 units, respectively, for every unit increases in *t*; Xp would decrease .145 unit, and *s* predictor has no weight or has negligible weight.

The multiple regression equation for predicting the classroom rating for every unit increases in t, g, and e; Xe would increase .157, .430 and .708 units, respectively. It may be interpreted that teaching experience and academic grades have the highest weights and for very unit increases in *a*; Xc would decrease .056 unit, while *s* has very negligible or no weight. It may be inferred that classroom ratings may be predicted through teaching experience, academic grades and aptitude potentials.

The multiple regression equation for predicting the final examination marks is that for every unit increases in *t*, *g*, and *e*, Xm would increase .432, 10.268 and 1.46 units, respectively; and for every unit increases in *a*, Xm would decrease .374 unit. The academic grades have the highest weight for predicting the criterion.

The sex variable as a predictor was studied exclusively in terms of teacher-effectiveness by the ž-test.[2] For each criterion measure, since the sample is large, we may assume a normal distribution of the 'z' s. The z-value for personality ratings for boys and girls was found to be 3.696. This is highly significant even at .01 level of confidence (which for a large sample is 2.58). The null hypothesis is rejected and the obtained difference is significant. The z-value for the final examination marks as criterion was obtained as 2.268. This value of 'z' is significant at .05 level of confidence but not at .01 level of confidence (which for a large sample is 1.96 at .05 level). The z-value for classroom rating as a criterion was found to be 1.00. The obtained 'z' fails to reach the .05 level of significance. The null hypothesis is accepted and the obtained difference is not significant and may be attributable to sampling error. A more practical interpretation is that there is insufficient evidence of sex-difference in classroom teaching-effectiveness.

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[2] J.P. Guilford, *Fundamental Statistics in Psychology and Education*, McGraw Hill Book Company, Inc., New York, London, 1956, p. 186

Conclusions

The final statements which emerge from this study may be formulated as follows:

1. It seems that there is a significant relationship between predictors and the criteria of teacher-effectiveness. It indicates the high form for the multiple prediction.
2. It appears that the academic grades as predictor have positive and high regression weights for predicting the criteria of teacher-effectiveness. It may be stated that there is significant relationship between academic grades and teacher-effectiveness in terms of criterion measures.
3. It also seems that socio-economic status as predictor has no or negligible weights for predicting the criterion. It may be stated that there is no significant relationship between socio-economic status and teacher-effectiveness.
4. It appears that the sex variable as predictor has no significant difference as compared with the classroom-teaching rating and may differ in other teacher behaviour dimensions.
5. It appears that teaching experience as predictor has a positive regression weight for predicting the cirteria. It may

be stated that the teaching experience may be a cause for teacher-effectiveness.

6. It seems that the age variable as predictor has low regression weight for predicting the criterion. It may be concluded that it has no significant relationship with teacher-effectiveness in terms of criterion measures.

In considering the findings of this study, it is important and relevant to note that all the conclusions to be drawn are necessarily approximate, as all inferences are based on empirical data which are by their very nature characterized by some degree of unreliability and are probability estimates.

Moreover, a follow-up study is proposed for the predictors of teacher-effectiveness to throw some light on the findings after actual placement in the job and great confidence can be placed in the conclusions.

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On the Performance Prediction of a Group of Students

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Anjani Kumar Sinha

With the mounting pressure on higher education in India, the need for selective admission, at least to science courses, is being increasingly felt. In view of the inadequacy of conventional techniques of selection, the authors have, in this study, explored the possibilities of using statistical methods. Applying Wald's (1944) technique, they have attempted to see how far the marks secured by a student in any two of the four subjects—English, Hindi, physics and chemistry—would be helpful in predicting his performance at the pre-science stage. They have also examined the possibilities of classification on the basis of only one subject out of these. The results show, among other things, that the association between the actual and predicted performance is significant when classification is done taking into consideration either physics or chemistry. In the case of physics the association is relatively more intense.

Higher education has expanded considerably during recent years. It is estimated that the enrolments in our colleges and universities will

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increase to seven and eight millions by 1985-86, and the country will have twice the estimated requirements of manpower for her national development, if the present rate of growth of education is maintained. The Education Commission (1964) is, therefore, in favour of making admission to higher education selective. The wastage is appalling at the higher stage of education in this country. It has been estimated that on an average, out of every 100 students who enter the first year class in a college only about 41 emerge as successful at the B.A. Examination and of these, the third divisioners account for about 57 per cent.

Thus a high rate of failure in examinations and low standards of achievement have marred the efficiency of the Indian education system for many weary decades.

The deplorable wastage of human resources as well as funds goes on year after year. But what is worse is the terrible frustration of hopes and aspirations due to failures. Perhaps the majority of them are not fit to reiceve university education.

If the policy of admission by selection is adopted the importance of the technique of selection becomes very important. For example, all those students who pass the Secondary School examination with science aspire for admission in the pre-science class of some college. The number of applications for admissions in pre-science class far exceeds the sanctioned number of seats. The conventional technique of selection is that the applicants are arranged in order of merit. The authorities responsible for selection take as many students from the merit list as to fill up the sanctioned number of seats in their colleges.

In this paper we have tried to explore the possibilities of using statistical methods in selection procedure. Wald (1944) gave a method of classifying an individual in one of the two groups on the basis of some *a priori* knowldge. We have applied that tehnique to examine the extent to which it may be helpful to the authorities responsible for selection of students in pre-science class of a college.

We have taken the four subjects which are common at the secondary and the the pre-science stage. These subjects are English, Hindi physics and chemistry. We have tried to see how far the marks secured by students in any two of these subjects at the secondary stage may be helpful in predicting the performance (pass or fail) of the students at the pre-science stage. We have further examined the possibility of classification on the basis of single subject only. Further, we have suggested a modification to be made in the selection procedure if selection is made on the basis of aggregate of marks (i.e., total marks) obtained by a candidate. We have shown that, so far the present data is concerned, our method gives better results than those obtained by Wald's method.

Theory

In our case Wald's method of classification of individuals can be interpreted like this: Let π_1 denote the population of Pass group students and π_2 denote the population of Fail group students. Random samples of sizes n_1 and n_2 are drawn from the two populations respectively. It is assumed that for large samples at least the variables follow a p-variate normal law with a common dispersion matrix. The p-variates are the marks in the p-subjects in which the two groups of students appear. The students of the two samples have appeared at two examinations—the Secondary School Examination and the Pre-Science Examination. The marks of the students belonging to the two groups is known for Secondary School Examination but for pre-science examination only their performances as pass or fail are known, and on the basis of this knowledge the students have been divided into two groups. Assuming that x and y relate to populations π_1 and π_2 respectively, let $x_{i\alpha}$ denote the αth observation on x_i ($i=1,2,\ldots p$; $\alpha=1, 2, \ldots n_1$) and $y_{i\beta}$ denote βth observation on y_i ($i=1,2,\ldots p$; $\beta=1,2\ldots n_2$). Denote by z_i ($i=1,2, \ldots p$) a single observation on the ith variate drawn from a p-variate population π. The population π is either identical with π_1 or with π_2. On the basis of the observations $x_{i\alpha}$, $y_i\beta$ and z_i we want to test the hypotheses that the population π from which the set $(z_1, z_2, \ldots z_p)$ has been drawn is identical with π_2.

To make this sort of classification, we compute the corrected sum of squares and product matrices $(S_{x_i x_j})$, $(S_{y_i y_j})$ and the pooled dispersion matrix

$(S_{ij}) = \frac{1}{n_1+n_2-2}\left[(S_{x_i x_j}) + (S_{y_i y_j}) \right]$. Next (S^{ij}), the inverse of

(S_{ij}), is calculated. The classification equation U is then given by

$$U=\sum_{i}\sum_{j} S^{ij}z_i\,(\bar{x}_j-\bar{y}_j),\ \text{where}$$

z_i plays the same role for individuals to be classified as $x_{i\alpha}$ and $y_{i\beta}$ do for observed individuals. After substituting the computed values the classifying equation is obtained in the form

$$U=k_1z_1+k_2z_2+\quad\cdot\quad+k_pz_p.$$

Assuming the equality of type I and type II errors the critical region, C, is obtained by computing

$\bar{\alpha}_1=k_1\bar{x}_1+k_2\bar{x}_2+\ \dots\ +k_p\bar{x}_p$ and
$\bar{\alpha}_2=k_1\bar{y}_1+k_2\bar{y}_2+\dots\ \dots+k_p\bar{y}_p.$
The C is given by $C=\dfrac{(\bar{\alpha}_1+\bar{\alpha}_2)}{2}.$

For $U \leq C$, classify the individual as coming from π_2 population, and
$U > C$, classify the individual as coming from π_1 population.

The probability of making an error of type I, that is classifying an individual as one who will pass when he actually fails is given by

$$P_1=\frac{1}{\sqrt{2\pi}}\int_{\lambda}^{\infty} e^{-t^2/2}dt,\ \text{where, } \lambda, \text{ is given by } \lambda=\frac{\bar{\alpha}_1-\bar{\alpha}_2}{2\bar{\sigma}},$$

and $\bar{\sigma}^2$ is given by

$$\bar{\sigma}^2=\sum_{i=1}^{p}\sum_{j=1}^{p} S^{ij}(\bar{x}_i-\bar{y}_i)(\bar{x}_j-\bar{y}_j).$$

Since while defining our critical region we have made the probability of committing type I error equal to that of type II error, P_1 is also the probability of committing type II error.

In our case, the value of p is equal to 2. Actually we have considered four subjects which are common at the Secondary and at the Pre-Science stage. While constructing the classification equation only two of the four subjects have been taken into account at a time. There are six possible combinations of four subjects taken two at a time. So we have constructed six classification equations and we have tried to find out which of these six combination pairs gives the best classification.

Method

Out of 785 regular candidates who appeared at the Pre-Science Examination, 1969 (Annual) from Patna University, a random sample of 221 students was taken, which constituted approximately a 28 per cent sample. The non-collegiate candidates were not included in our sample because of the inconvenience likely to be faced in securing their past records. Among 221 candidates 188 (85.07 per cent) were males and 33 (14.93 per cent) were females. From the tabulation roll of the Pre-Science 1969 Examination performance, pass or fail of each candidate appearing in our sample was noted. The 221 candidates were then divided into Pass group π_1 and Fail group π_2 on the basis of their performances at the Pre-science Examination. Out of 221, it was seen that 169 belonged to Pass group and 52 belonged to Fail group. From the forms, which the candidates had filled up at the time of depositing the examination fees, their college roll numbers were noted down. The various college offices were then contacted for recording the marks of these candidates at the Secondary School Examination. The six possible combination pairs in our case were English and Hindi (x_1, y_1; x_2, y_2), English and Physics (x_1 y; x_3, y_3); English and Chemistry (x_1, y_1; x_4, y_4); Hindi and Physics (x_2, y_2; x_3, y_3), Hindi and Chemistry (x_2, y_2; x_4, y_4) and Physics and Chemistry (x_3, y_3; x_4, y_4). (x_i y_i) means that the ith subject is denoted by x_i for Pass group and y_i for Fail group. We have computed the six different classification equations. After determining the value of C, in each case the classification of students was done.

Results

Pass Group : $\Sigma x_1 = 18870$; $\Sigma x_2 = 18451$; $\Sigma x_3 = 9974$; $\Sigma x_4 = 10939$; $\Sigma x_1^2 = 2149829$; $\Sigma x_2^2 = 2050717$; $\Sigma x_3^2 = 604304$; $\Sigma x_4^2 = 722562$; $\Sigma x_1 x_2 = 2055468$; $\Sigma x_1 x_3 = 1116995$; $\Sigma x_1 x_4 = 650352$; $\Sigma x_2 x_3 = 1093751$; $\Sigma x_2 x_4 = 1197067$; $\Sigma x_3 x_4 = 650352$.

Fail Group : $\Sigma y_1 = 5352$; $\Sigma y_2 = 5638$; $\Sigma y_3 = 2759$; $\Sigma y_4 = 3174$; $\Sigma y_1^2 = 566946$; $\Sigma y_2^2 = 619456$; $\Sigma y_3^2 = 150757$; $\Sigma y_4^2 = 198113$; $\Sigma y_1 y_2 = 582434$; $\Sigma y_1 y_3 = 285382$; $\Sigma y_1 y_4 = 328521$; $\Sigma y_2 y_3 = 301181$; $\Sigma y_2 y_4 = 345780$; $\Sigma y_3 y_4 = 169714$.

The pooled dispersion matrices and corresponding inverses are given in Table 1. At the foot of the table the average of marks of Pass and Fail group of students in the different subjects are given.

TABLE 1

(S_{ij}) *English and Hindi*		*E*	*H*	(S^{ij}) *E H*		*E*	*H*
	E	*269.2544*	*−.116804*		*E*	*.0037139597*	*.0002137326*
	H	*−11.6804*	*202.9664*		*H*	*.0002137326*	*.0049269238*
(S_{ij}) Eng. and Physics		E	P	(S^{ij}) E P		E	P
	E	269.2544	21.6725		E	.0037861705	−.0008971306
	P	21.6725	91.4647		P	−.0008971306	.0111457542
(S_{ij}) Eng. and Chem.		E	C	(S^{ij}) E C		E	G
	E	269.2544	17.0929		E	.0037612985	−.0007456992
	C	17.0929	86.2164		C	−.0007456992	.0117465605
(S_{ij}) Hin. and Physics		H	P	(S^{ij}) H P		H	P
	H	202.9664	31.3029		H	.0052014715	−.0017801528
	P	31.3029	91.4647		P	−.0017801528	.0115424198
(S_{ij}) Hin. and Chem.		H	C	(S^{ij}) H C		H	C
	H	202.9664	20.1342		H	.0050443113	−.0011806709
	C	20.1342	86.2164		C	−.0011806709	.0118750690
(S_{ij}) Phy. and Chem.		P	C	(S^{ij}) P C		P	C
	P	91.4647	27.7085		P	.0121124588	−.0038927388
	C	27.7085	86.2164		C	−.0038927388	.0128497821

$$\bar{x}_1=111.6568;\ \bar{x}_2=109.1775;\ \bar{x}_3=59.0178;\ \bar{x}_4=64.7278$$
$$\bar{y}_1=102.9231;\ \bar{y}_2=108.4231;\ \bar{y}_3=953.577;\ \bar{y}_4=61.0385$$

With the help of these computations, the six classification equations, their corresponding critical regions are give in Table 2.

Once the classification equations were formed and the critical regions were determined, it was quite easy to have predicted performance of individuals. For that one needs only to substitute the value of z_i by the marks obtained in the corresponding subjects at the secondary

TABLE 2

S. No.	*Combination Pairs*	*Classification Equations*	*Criticle Regions = C*
1.	English and Hindi	$U = .0325978497 z_1 + .0055835477\ z_2$	4.104913325
2.	English and Physics	$U = .0277202892\ z_1 + .0585945401\ z_3$	6.25761463160
3.	English and Chemistry	$U = .0296855018\ z_1 + .0368238725\ z_4$	5.50055710180
4.	Hindi and Physics	$U = -.0066858986\ z_2 + .0674510278\ z_3$	3.0523760596
5.	Hindi and Chemistry	$U = -.0005504207\ z_2 + .0429199940\ z_4$	2.6390582318
6.	Physics and Chemistry	$U = .0578299547\ z_3 + .0242055886\ z_4$	4.7627842028

school stage and see if the calculated U so obtained is greater or less than or equal to C. Details of calculation of U for each candidate is not given here to save space. 2 x 2 contigency tables showing the actual and predicted performances of individuals in different cases were then formed. These tables are given in Table 3 combination pair-wise. The last three columns give the value of X^2 calculated on the hypothesis of no association of predicted and actual performance, the theoretical probability of committing type I error and proportion of misclassified individuals respectively.

Discussion

The hypothesis of no association between the predicted and actual results of the candidates is rejected at 5 per cent probability level in all the cases. In our search for best combination pair we had three criterion for selection. The first was that the combination pairs be ranked according to X^2-value—that pair for which X^2 is maximum getting rank one and so on. The second criterion was that the combination pairs

TABLE 3

S. No.	*2x2 Contingency Tables*	*Predicted Pass*	*Predicted Fail*	*Calculated* x^2	*Type I error*	*Actual Proportion of Misclassification*
1. (EH)	Actual Pass	110	59	4.841	.3936	.384
	Actual Fail	25	27	$.025<p<.05$		
2. (EP)	Actual Pass	115	54	16.539	.3482	.330
	Actual Pass	19	33	$p<.005$		
3. (EC)	Actual Pass	107	62	8.577	.3782	.375
	Actual Fail	21	31	$p<.005$		
4. (HP)	Actual Pass	107	62	13.362 $p<.005$	.3744	.362
	Actual Fail	18	34			
5. (HC)	Actual Pass	104	65	6.000	.4207	.393
	Actual Fail	22	30			
6. (PC)	Actual Pass	103	66	11.128	.3709	.384
	Actual Fail	18	34	$p<.005$		

should be ranked according to probability for type I error—the pair for which the type I error is least getting rank one and so on. The third criterion might be that the combination pairs should be ranked according to actual proportions of candidates misclassified—the pair for which the actual proportion of misclassified candidates is least getting rank one and so on. These three sets of ranking of the combination pairs are given in Table 4.

It is clear that combination pairs do not have the same rank according to the three criterion. So in order to make the best estimate of their rankings we first calculate Kendall's coefficient of con-

TABLE 4

Ranking of Combination Pairs According to Three Criterion

Sl. No.	*Combination Pairs*	*Ranking according to criterion I*	*Ranking according to criterion II*	*Ranking according to criterion III*	*Total*
1.	English and Hindi	6	5	4½	15½
2.	English and Physics	1	1	1	3
3.	English and Chemistry	4	4	3	11
4.	Hindi and Physics	2	3	2	7
5.	Hindi and Chemistry	5	6	6	17
6.	Physics and Chemistry	3	2	4½	9½

cordance W, and see if this is significant. If this is found to be significant, then the procedure suggested by Kendall (1955) could be adopted, i.e., we shall rank the combination pairs according to sum of ranks allotted to the combination pairs. This will give the best estimate in certain sense associated with least square. Since tie is present in one set of ranking the appropriate formula for calculation of W will be

$$W = \frac{S}{\frac{1}{12} m^2 (n^3 - n) - m \sum_{T'} T'}$$

where $T' = \frac{1}{13} \sum_{t} (t^3 - t)$. In our case $m=3$ and $n=6$; $t=2$, $S=137$.

Hence $W = .8782$.

Using the Appendix Table 6 given in his book *Rank Correlation Method* by Kendall, we see that for the 5 per cent level the critical value of S is 103.9 while for 1 per cent level the critical value of S is 122.8. This means that the probability of obtaining a value as great as or greater than the observed value is less than .01. It is thus significant in the conventional sense of the term.

Hence we may rank combination pairs according to sums of ranks alloted to them. In that event the ranking order is found as follows:

Combination pair:	(EH)	(EP)	(EC)	(HP)	(HC)	(PC)
Estimated ranks:	5	1	4	2	6	3

It is seen that whatever criterion of choosing the best combination pair is employed, the combination of choice turns out to be English and Physics.

It is of interest to see as to what extent a single subject can be utilised for classifying the students into Pass and Fail group. The classifying equation in this case will be of the type

$$U - KZ_p$$

In the usual fashion C, the critical region of U, can be obtained. Since only one subject is involved, the critical value of marks for classification purpose can be obtained from the equation $KZp = C$. The solution of this equation for Zp is denoted by Zpc. Considering the marks of pth subject, if a candidate secures greater than Zpc, he will be put into the Pass group otherwise into the Fail group.

The four 2 x 2 tables constructed in this case and other relevant calculations are shown in Table 5.

TABLE 5

Subjects		*Predicted Pass*	*Predicted Fail*	*X^2 Calculus*	*Type I error*	*Actual Proportion of misclassification*
English $U = .03240\, z_1$ $C = .398045$ $z_{pc} = 122$	Actual Pass	40	129	3.549	.4880	.611
	Actual Fail	6	46			
Hindi $U = .00372\, z_2$ $C = .404735$ $Z_{pc} = 108$	Actual Pass	91	78	.059	.4602	.484
	Actual Fail	29	23			
Physics $U = .06516\, z_3$ $C = 3.651400$ $Z_{pc} = 62$	Actual Pass	105	64	13.934	.3770	.366
	Actual Fail	17	35			
Chemistry $U = .04279\, z_4$ $C = 2.690770$ $Z_{pc} = 62$	Actual Pass	104	65	6.004	.4207	.394
	Actual Fail	22	30			

It comes out that the literature subjects, viz., English and Hindi are not good in making classification so far the students of science are concerned. This is evident from the value of X^2 which is obtained in these cases. The association between the actual and predicted performances of students is found to be significant when the classification is done taking either physics or chemistry. In case of physics, the association is relatively more intense. In fact, the classification done on the basis of this subject is more efficient than that made with the help of the combination pairs (English-Hindi), (English-Chemistry), (Hindi-Chemistry) and (Physics-Chemistry)—if efficiency is measured in terms of actual proportion of misclassification.

The conventional method of selection for admission is what may be termed as selection by the aggregate method, i.e., the total marks obtained by a candidate. It is of interest to see how one can find a critical region for the aggregate of marks. If from past data one knows the proportion of successful candidates P, at the last examination, he can use this information to find critical value of aggregate of marks from the frequency distribution of aggregate of marks at the earlier examination. An alternative procedure would be to rank the sample of the students according to aggregate of marks from below and rank the (1-P) per cent candidates. The maximum aggregate among these (1-P) per cent persons will be the critical value for the purpose of classification.

In our case the frequency distribution of aggregate of marks of the two groups was found as shown in Table 6.

TABLE 6

Frequency Distributions of Aggregate of Marks of Pass Group and Fail Group of Students

Group	*Marks*									
	380 410	410 440	440 470	470 500	500 530	530 560	560 590	590 620	620 650	650 680
Pass	1	1	1	16	17	42	41	36	12	2
Fail	2	2	7	5	8	11	13	3	1	0
Combined Pass and Fail	3	3	8	21	25	53	54	39	13	2

Mean of the combined frequency distribution,
$\bar{x}=553.38$ and S.D.$=50.7$

It is apparent that the distribution is a skew one. However, as a first approximation assuming the normality and utilising the information that P=74.7 (In the Pre-Science 1969A Examination 74.7 per cent candidates passed the examination), we calculated the value of aggregate for which $\int_{-\infty}^{t} \Phi(t)\,dt=.253$.This is given by $\bar{x}-674 \times$ S.D.= 519 (approx.).

This 519 is suggested as the critical value of the aggregate marks for classifying the students into Pass and Fail group. If a candidate secures less than or equal to 519 marks out of 900 at the Secondary School Examination he is assigned to Fail group otherwise he will be assigned to the Pass group.

When the 25.3 per cent candidates were ranked from below (i.e. the students who has the lowest marks gets rank one), it was seen that the highest aggregate in this group of candidates was 524. This agrees to a great extent with our estimated value 519. 2 x 2 table giving the actual and predicted results of candidates by these methods are also given in Tables 7 and 8.

TABLE 7

Table Giving the Predicted Results vs. Actual Results of 221 Candidates (Prediction being made by calculating the critical value of aggregate of marks from the distribution of aggregate of marks)

Group	*Predicted Pass*	*Predicted Fail*	*Total*
Actual Pass	138	31	169
Actual Fail	31	21	52
Combind Pass and Fail	169	52	221

$X^2=10.737$

TABLE 8

Table Giving the Predicted Results vs. Actual Results of 221 Candidates (Prediction being made by finding the critical value of aggregate by ranking 25.3 per cent candidates from below)

Group	*Predicted Pass*	*Predicted Fail*	*Total*
Actual Pass	137	32	169
Actual Fail	30	22	52
Combined Pass and Fail	167	54	221

$X^2=11.765$

In these cases also the value of X^2 calculated on the basis of hypothesis of independence of actual and predicted results, are found to be highly significant. This means that classification of students can be efficiently done by employing our proposed technique. In fact the number of individuals misclassified by adopting the method of calculation of critical value of aggregate from the distribution of aggregates is 62. This means that estimated probability of misclassification is 62/221=.279 or 27.90 per cent. Comparing this with probabilities of misclassifications (Table 3) by using Wald's method in case of different combination pairs, we see that this is less than theirs.

It may be argued that the method of finding critical value of aggregate, by considering the distribution of aggregate and assuming the proportion of failure in the last examination, is not quite satisfactory as the proportion of failures varies from year to year. In this connection we have two things to say. *Firstly*, similar criticism can be made of Wald's method also which too uses *a priori* information in forming classification equation. *Secondly*, if we have data on proportion of failures for a number of years, we may calculate expected proportion of failures which is likely to be a consistent estimate of the proportion of failures. Moreover, we suggest that analogous to the fraction defective chart which is kept in industry we may have a fraction failure chart for this purpose. The central line, i.e., $\bar{p}$ of such a chart will be estimated proportion of failures in the population of students, appearing for certain examination. In our further work, we propose to show the utility of such a chart in educational statistics.

REFERENCES

Fisher, R.A. "The statistical utilisation of multiple measurements", *Annals of Eugenics*, 1938.

Wald Abraham. "On the statistical problem arising in the classification of an individual into one of two groups", *Annals of Mathematical Statistics*, vol. 15, 1944.

Mouly, George J. *The Science of Educational Research*, Eurasia Publishing House, New Delhi, 1964.

Mukherjee, Kartick C. *Under Development Educational Policy and Planning*, Asia Publishing House, 1967.

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Academic Motivation as a Determinant of School Attendance and Attainment

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The author discusses a study undertaken to test two hypotheses: (1) that academic motivation is an important determinant of examination performance, independent of school attendance; and (2) that school attendance may itself be a function of the academic motivation of a pupil, and so a high association between the two cannot guarantee that school attendance is instrumental in school attainment. Relevant data obtained from 160 Ss were analysed using the Spearman rhos and the Kendall partial-rhos. The results confirm both hypotheses.

This study represents an attempt to analyse systematically (1) the relationship between academic motivation and school attendance, and (2) the relation of the first two variables with scholastic attainment. As academic motivation correlates more closely with the school attainment than with the reasoning ability (Entwistle, 1968), and motivation, in general, energizes, directs and sustains learning proces (Melton, 1941), it may be assumed that the former is an important determiner of examination performance independent from school attendance. In addition, the directing role of motivation suggests that school attend-

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ance may itself be a function of the academic motivation of a child and so, a high association between the two cannot guarantee that school attendance is instrumental in school attainment.

The theoretical reasonings on which the first hypothesis is based are: (1)* that academic motivation refers to one's "determination to succeed in academic studies" (Entwistle, 1968) or "competitiveness with standards of academic excellence" (De and Singh, 1970), and motivation to do well in school tends to produce better results than more generalized measures of need to achieve or intrinsic intellectual interests (Furst, 1966); and (2) that this motivation expresses itself in favourable attitudes towards school, high aspirations for a scholarly future, and good study habits (Finger and Schlesser, 1965). Since academic motivation builds up a positive attitude towards school, a close association between this motivation and school attendance, as stated in the second hypothesis, is quite natural.

METHOD

Subjects

Out of two hundred and twenty-two students from the VIII through XI Classes with an age range of 12 to 17 (Mdn=14.5 years) as reported elsewhere (De and Singh, 1970), only one hundred and sixty (53 from the suburban and 107 from the rural schools) were used as *Ss* for this study. This reduction in *N* of the *Ss* was because of the unavailability of the record of marks and attendance of some students.

Test

The 20-item Hindi version of Aberdeen Academic-Motivation Inventory (De and Singh, 1970), which shows a temporal stability of .82 and validity coefficient of .62, was used to assess academic motivation.

RESULTS

The results are based on the academic motivation scores, the per cent of marks obtained and the number of days the *Ss* attended their schools. Due to the limitations of varying numbers of papers examined and classes held in different grades and schools, it was preferred to analyse the data separately for each class and school. Six groups of *Ss* were thus formed—four (Classes VIII, IX, X, and XI) from the rural school and two (Classes X and XI) from the suburban school. The Table presents the separate Spearman rhos and the Kendall partial-rhos among the three variables for each of the six groups.

TABLE

Rhos and Partial-Rhos Among Academic Motivation (x), School Attendance (y), and Academic Attainment (z)

	(n=107) RURAL H. E. SCHOOL								(n53=) SUBURBAN H. E. SCHOOL			
	Classes								Classes			
	VIII (n=31)		IX (n=31)		X (n=22)		XI (n=23)		X (n=23)		XI (n=30)	
Variables	y	z	y	z	y	z	y	z	y	z	y	z
x	.42	.52	.38	.41	.32	.50	.33	.49	.47	.51	.44	.48
	a	a	b	a		a		a	a	a	a	a
x*	.26	.43	.31	.34	.19	.44	.25	.43	.29	.35	.33	.39
		a	b	b		a		a		b	b	b
y		.41		.28		.32		.33		.49		.36
		a								a		b
y*		.24		.14		.19		.25		.32		.22

a=$p<.01$ b=$p<.05$ *partial-rhos

Three facts are evident from the table. First, scholastic attainment shows a higher positive correlation with academic motivation than with school attendance. All the six rho-coefficients between academic motivation and school performance are significant even beyond the .01 level of confidence. A similar trend is noticed when the *y* variable school attendance is partialed out. Second, in general, significant rhos run between academic motivation and school attendance. Out of the six comparisons, four yield significant values and two insignificant ones which miss the .05 level by just a litttle margin. When the effect of *z* variable, school attainment, is nullified, such a relationship, however, proves to be an artifact. This indicates that the correlation between academic motivation and school attendance depends upon the incentive variable of good grades. Finally, school attendance does not seem to influence the examination performance of the *Ss*. While only three rhos between the *y* and the *z* variables are significant, none of the partial-rhos comes out to be significant even at the .05 level, when the *x* variable, academic motivation, is partialed out.

DISCUSSION

The evidence supports the two original hypotheses. We observe significant positive correlations between academic motivation and attainment even when the influence of school attendance is controlled. Such evidence is in keeping with our first assumption, and shows that the Hindi version of the Academic Motivation Inventory also measures a behavioural trait which is associated with school attainment as has been claimed by the original test maker (Entwistle, 1968, p. 186).

The second hypothesis has also been confirmed. While academic motivation exhibits a tendency to correlate significantly with school attendance, the latter does not show a parallel relationship with school marks. This trend can be linked up with the directing function of motivation. The amount of variable behaviour one exhibits for an incentive varies with the strength of motivation, and the choice of one behaviour over another in reaching the goal varies with the directing properties of one's motivation. A curious student, for example, goes to the library instead of to the movies to get the benefit of exhaustive knowledge. Assuming good grades as incentives for academic motivation, the school-going may be considered one type of behavioural manifestation of this motivation. A high positive correlation between school-going and academic motivation is, hence, logical as the ground that the latter enables one to form favourable attitudes towards school. However, school attendance plus academic motivation appears to be an important determinant of school attainment, but the former by itself is a negligible factor in the examination performance of the *Ss*.

A point on the limitation of the study is well worth consideration. The academic motivation inventory was answered by the Ss during the beginning of a new session, but the records of marks and attendance were made available for the preceding year. There is a possibility of spurious correlations among the three variables arising out of the changed strength of motivation from the fore-to the after-examination period. Following Robinson's idea (1961) expressed in connection with achievement motivation that academic success leads to greater motivation while failure lowers it, higher grades may be regarded as a reward, lower grades as a punishment. If so, the occurrence of an emotional reward for better results in examinations, and punishment for lower grades may directly alter the strength of academic motivation itself, and thus the trends observed in correlation among the three variables may prove to be misleading.

REFERENCES

De, B. and Singh, R. "A Hindi adaptation of the Aberdeen Academic Motivation Inventory", *Ind. Educ. Rev.,* 1970, 5, (1) 71-74.

De, B. and Singh, R. "Home adjustment as a determinant of academic motivation", *Ind. Educ. Rev.,* 1970, 5, (2).

Entwistle, N.J. "Academic motivation and school attainment", *Brit. J. Educ. Psychol.,* 1968, 38 (2), 181-188.

Finger, J.A. and Schlesser, G.E. Non-intellective predictors of academic success in school and college. *School Rev., 73,* 14-29.

Furst, E.J. "Validity of some objective scales of motivation for predicting academic achievement", *Educ Psychol. Measmt.,* 1966, 26, 927-933.

Melton, A.W. Article on Learning in *Encyclopedia of Educational Research,* Monroe, W.E. (Ed.) New York: MacMillan, 1941.

Robinson, W.P. The Measurement of Achievement Motivation. Unpublished Doctoral Dissertation, 1961, Oxford Univ.

Siegal, S. *Nonparametric Statistics for the Behavioral Sciences.* New York: MacGraw-Hill Book, 1956, 9, 202-213.

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An Analytical Study of Some Major Objectives of Teaching Social Studies and Ways of Attaining Them

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This study of the teaching of social studies at the secondary level in four Indian States was undertaken to determine (i) whether the teachers properly understood the integrated approach to social studies as envisaged by the experts; (ii) whether the teaching was done in accordance with the principles of modern curriculum planning. The findings suggest that while there is a good deal of understanding of what should be done, the picture of what is being done in actual practice is not very encouraging.

This study is the result of an intensive research undertaken to investigate the present state of teaching of social studies in the four States, viz., Andhra Pradesh, Kerala, Madras and Mysore. The main purpose of the study was to analyse some common objectives stated in the syllabi of the four States in terms of the expected outcomes, related content, learning experiences and evaluation devices, and then, to collect evidences both from experts and teachers to ans-

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This paper is based on the first author's M.Ed thesis submitted to the University of Mysore in 1967.

wer the following two questions: one, whether the teachers properly understood the integrated approach to social studies as envisaged by the experts in creating it, and two, whether the teaching of social studies was done in accordance with the principles of modern curriculum planning.

Preparation of Theoretical Model

Before the specific hypotheses are stated, it is necessary to describe the theoretical model on which the reactions of experts and teachers were sought. A thorough screening of the literature of social studies was done and a list of major objectives was prepared. Similarly, after having gone through the syllabi of the four States another list of common objectives was made. The following three objectives found common in both the lists were selected for the study:

1. To make pupils understand interaction between man and his environment.
2. To promote international understanding.
3. To develop effective citizens of democracy.

These objectives were further analysed on the basis of a model curriculum plan, i.e., in terms of expected outcomes, broad topics, learning experiences and evaluation devices. An exhaustive list of items under each head was prepared by referring to expert sources like *Social Studies—A Draft Syllabus* prepared by the National Council of Educational Research and Training, New Delhi.

This plan was discussed, prooned and finalised by a committee of local experts. With the help of the same committee, the model was converted into a rating scale by introducing in it the criteria of desirability for expected outcomes, of suitability for broad topics, of desirability, practicability and 'provided or not' for learning experiences and of desirability, practicability and 'used or not' for evaluation devices. The reactions of experts and teachers were sought in terms of ratings with reference to the above-mentioned criteria and were done on a three-point scale marked by A, B, and C which meant high, moderate and low degree of agreement respectively with the model. When such items were considered as desirable or suitable

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or practicable by the experts and the teachers did not agree with the same, it was but logical to interpret this deviation as a poor understanding on the part of the later group. For example, if a particular expected outcome of social studies was considered desirable by the experts but not by the teachers, that reflected on the understanding of the teachers about the outcome in question. In a nutshell, then, different degrees of agreement on the model were interpreted as different degrees of understanding of the teachers.

HYPOTHESES

The following hypotheses were accepted or rejected on the basis of the data obtained from the experts and the teachers on the scale.

Hypothesis I

Experts will tend to confirm the model.

Sub-hypotheses

H-1. Experts will tend to confirm the desirability of expected outcomes in the model.
H-2. Experts will tend to confirm the suitability of the broad topics in the model.
H-3. Experts will tend to confirm the desirability of learning experiences in the model.
H-4. Experts will tend to confirm the practicability of the learning experiences in the model.
H-5. Experts will tend to confirm the implementation ('provided or not') of the learning experiences in the model.
H-6. Experts will tend to confirm the desirability of the evaluation devices in the model.
H-7. Experts will tend to confirm the practicability of the evaluation devices in the model.
H-8. Experts will tend to confirm the implementation ('used or not') of the evaluation devices in the model.

Hypothesis II

Teachers will tend to agree with the model.

Sub-hypotheses

H-1. Teachers will tend to agree with the desirability of expected outcomes in the model.
H-2. Teachers will tend to agree with the suitability of broad topics in the model.
H-3. Teachers will tend to agree with the desirability of learning experiences in the model.
H-4. Teachers will tend to agree with the practicability of learning experiences in the model.
H-5. Teachers will tend to agree with the desirability of evaluation devices in the model.
H-6. Teachers will tend to agree with the implementation ('provided or not') of the learning experiences in the model.
H-7. Teachers will tend to agree with the practicability of evaluation devices in the model.
H-8. Teachers will tend to agree with the implementation ('used or not') of evaluation devices in the model.

Sample

Experts. Selecting a representative sample of experts of social studies was a difficult task. A list of 200 experts from all over the country was prepared by referring to various sources such as reports of seminars, workshops, etc., a list of social studies experts obtained from the Department of Field Services, NCERT and the list of research studies done in the field of education, published by the NCERT. This list included the following categories of experts:

1. Teacher Educators
2. Textbook writers
3. Subject Inspectors
4. Research workers
5. Curriculum and Evaluation Officers

In all, 200 experts in the country were sent the rating scale for their reactions.

Teachers. Selecting a representative sample of teachers from the four States was a huge task. In fact, this sample was to be a stratified random sample, so that, it might not only represent the regional scatterings of the State, but also take care of the urban and rural, the number of more experienced and less experienced male and female teachers. Keeping in mind these variables, an exhaustive list of social studies teachers was prepared out of the lists of the secondary schools of the four States. Out of these schools, a representative sample of 800 schools was chosen. These schools were requested to ask their social studies teachers to respond to the rating scale. The care was taken to distribute this scale evenly among the four States (200 each).

ANALYSIS OF DATA

The responses of the subjects were tabulated by devising a Tabulation Form in order to get the total reaction of an individual expert and a teacher towards Objectives 1, 2 and 3. Similarly the total reactions of the individual experts and teachers were tabulated with the help of a Final Scoring Sheet to get the total reaction of the whole group of experts and that of the teachers. In addition, the Final Scoring Sheet included information such as rating scale number, sex, and experience as was necessary for the teachers' group. Rating on the criteria of desirability, suitability and practicability, gave indication of the approval from the experts and the understanding of the teachers, whereas that of 'used or not' or 'provided or not' threw light on the extent of implementation of the programme of social studies.

The technique of chi-square was used to test the hypothetical predictions. The technique was found useful as it deals with discrete variable and it does not assume a distribution of a normal probability of responses. The technique also provided an opportunity to compare the observed frequencies with the theoretical ones in a given set of data.

Chi-square values for all the said hypotheses were found significant, at .01 level suggesting thereby that the results obtained were due to real difference between hypothetical frequencies and actual frequencies rather than chance.

In this study, an assumption was made that the subjects (experts and teachers) would be more often than not in agreement with the theoretical model. That meant that the number of frequencies in B would be larger than in C and in A would be larger than both in B and C. In other words the number of observed frequencies would be the largest in Category A and the smallest in Category C. When such a trend was confirmed by the value obtained from the chi-square test, the hypothesis was considered highly confirmed. When a trend was found in the reverse direction, i.e., the number of observed frequencies was the largest in Category C and the smallest in Category A, the hypothesis was considered lowly confirmed. In case the largest number of frequencies was found in Category B and smaller in both A and C, the hypothesis was considered moderately supported.

RESULTS AND DISCUSSION

The main purpose of the study was to analyse the objectives of social studies and study the ways and means of achieving them. There were two aspects of the issue: (1) what should be done?, and (2) what is being done? The former was theoretical and the latter the practical part of it. The criteria on rating for outcomes and broad topics pertained only to what should be done, whereas those for learning experiences and evaluation devices included both the parts stated above.

Hypothesis 1

The results presented in Tables 1, 2 and 3 show the chi-square values and their significance level for hypotheses H-1 to H-8 for each of the three objectives. The data showed that the four hypotheses under Objectives 1, 2 and 3 (H-1, H-2, H-3, and H-6) were fully confirmed suggesting thereby that the experts confirm the model with regard to desirability of outcomes, suitability of broad topics, desirability of learning experiences and desirability of evaluation devices. The high frequencies of approval on the part of experts with reference to the above four sub-hypotheses suggest that they can be taken as sound basis for curriculum planning in the field of social studies.

TABLE 1

Chi-Square Values and Their Significance Level for the Sub-Hypotheses (H) of Hypothesis I Pertaining to Objective I for Experts (N=60)

Factors of Investigation		Categories			Chi-Square	Level of Significance
H		A	B	C		
	Expected Outcomes					
1.1	Desirability	45	15	0	52.5	< .01
	Broad Topics					
1.2	Suitability	46	13	1	54.3	< .01
	Learning Experience					
1.3	Desirability	41	18	1	40.3	< .01
1.4	Practicability	15	39	6	29.1	< .01
1.5	Provided or not	1	14	45	51.1	< .01
	Evaluation Devices					
1.6	Desirability	43	15	2	43.9	< .01
1 7	Practicability	18	35	7	19.9	< .01
1.8	Used or not	2	19	39	34.3	< .01

df=2

TABLE 2

Chi-Square Values and Their Significance Level for the Sub-Hypotheses (H) of Hypothesis I Pertaining to Objective II of Experts (N=60)

Factors of Investigation		Categories			Chi-Square	Level of Significance
H		A	B	C		
	Expected Outcomes					
1.1	Desirability	48	11	1	61.3	< .01
	Broad Topics					
1.2	Suitability	48	10	2	60.4	< .01
	Learning Experience					
1.3	Desirability	34	24	2	26.8	< .01
1.4	Practicability	11	41	8	33.3	< .01
1.5	Provided or not	—	18	42	44.4	< .01
	Evaluation Devices					
1.6	Desirability	38	17	5	27.9	< .01
1.7	Practicability	13	35	12	16.9	< .01
1.8	Used or not	5	8	47	54.9	< .01

df=2

TABLE 3

Chi-Square Values and Their Significance Level for the Sub-Hypotheses (h) of Hypothesis 1 Pertaining to Objective III for Experts (N=60)

H	*Factors of Investigation*	*Categories* *A*	*B*	*C*	*Chi-square*	*Level of Significance*
	Expected Outcomes					
1.1	Desirability	47	12	1	57.7	< .01
	Broad Topics					
1.2	Suitability	48	11	1	61.3	< .01
	Learning Experiences					
1.3	Desirability	37	21	2	30.7	< .01
1.4	Practicability	14	36	10	19.6	< .01
1.5	Provided or not	4	14	42	38.8	< .01
	Evaluation Devices					
1.6	Desirability	42	14	4	38.8	< .01
1.7	Practicability	17	31	12	9.7	< .01
1.8	Used or not	5	15	40	32.5	< .01

df=2

Hypotheses H-4 and H-7 were regarding the praticability of learning experiences and evaluation devices. These hypotheses were moderately confirmed suggesting that the items in the model were only moderately practicable.

Hypotheses H-5 and H-8 which pertained to implementation of learning experiences and evaluation devices were only lowly confirmed suggesting thereby that in the opinion of the experts, the teachers were not implementing the learning experiences and the evaluation devices to the extent they should have been doing so.

To conclude, while the experts agreed with the model, regarding what should be the purpose of teaching social studies, what content should be used, what kind of learning experiences should be provided and what kind of evaluation tools should be employed by a teacher, in their opinion, the teachers were not able to implement the good practices as stated in the model. This suggests a lot of discrepancies between theory and practice, i.e., between what should be done and what is being done.

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Extraneous Variables Influencing the Teacher's Ratings

Before the results of the teacher's group (Hyopthesis II) were discussed, the investigator needed to know whether the data obtained was free from any contamination by extraneous variables. The influence of factors such as State, sex and experience of teachers had to be checked.

Since the major assumption in Hypothesis II was that the teachers would tend to agree with the model, it implied that irrespective of these variables, the assumption would be confirmed by them. The percentage of the four groups of teachers (representing the four States of South India) following in Categories A, B, and C in Objectives 1, 2 and 3 for all the factors and on all the criteria were calculated. The comparsion of the percentages showed that although some differences among various States were noticed within the categories, the deviations were not statistically significant indicating thereby that they did not contaminate the data so as to challenge the basic assmuption of the study. It is quite logical to conclude, therefore, that the teacher's ratings were not influenced by the variable State and that the samples drawn represented the parent population of the teachers in the southern region. Again, the comparison of the percentages of male and female teachers and of more experienced and less experienced teachers (below 5 years and above 5 years of experience) in different categories showed that these two variables also did not influence the ratings of teachers as a group.

Hypothesis II

The results presented in Tables 4, 5 and 6 show the chi-square values and their significance level for hypotheses H-1 to H-8, for each of the three objectives. The data showed that the four sub-hypotheses (H-1, H-2, H-3, and H-6) under all the three objectives were fully confirmed indicating thereby that the teachers agreed with the model with regard to desirability of outcomes, suitability of broad topics, the desirability of learning experiences and of the desirability of evaluation devices. In other words the teachers agreed fully with the theoretical

TABLE 4

Chi-Square Values and Their Significance Level for the Sub-Hypotheses (H) of Hypothesis II Pertaining to Objective I for Teachers (N=234)

Factors of Investigation		Categories			Chi-Square	Level of Significance
H		A	B	C		
	Expected Outcomes					
2.1	Desirability	130	94	10	97·23	< 01
	Broad Topics					
2.2	Suitability	156	69	9	140.02	< ·01
	Learning Experiences					
2.3	Desirability	130	93	11	95·10	< .01
2.4	Practicability	43	150	41	99.72	< ·01
2.5	Provided or not	13	77	144	110.00	< ·01
	Evaluation Devices					
2.6	Desirability	133	93	5	104.50	< .01
2.7	Practicability	46	161	27	134·79	< ·01
2.8	Used or not	17	92	125	78·54	< ·01

df=2

TABLE 5

Chi-Square Values and Their Significance Level for the Sub-Hypotheses (H) of Hypothesis II Pertaining to Objective II for Teachers (N=234)

Factors of Investigation		Categories			Chi-Square	Level of Significance
H		A	B	C		
	Expected Outcomes					
2·1	Desirability	139	81	14	100·3	< ·01
	Broad Topics					
2·2	Suitability	144	78	12	111·69	< ·01
	Learning Experiences					
2·3	Desirability	114	107	13	81·56	< 01
2·4	Practicability	38	143	53	82·69	< ·01
2·5	Provided or not	12	65	157	138·01	< ·01
	Evaluation Devices					
2·6	Desirability	105	103	26	52·02	< ·01
2·7	Practicability	43	145	46	86·38	< ·01
2·8	Used or not	18	68	148	110·3	< ·01

df=2

TABLE 6

Chi-Square Values and Their Significance Level for the Sub-Hypotheses (H) of Hypothesis II Pertaining to Objective III for Teachers (N=234)

Factors of Investigation		*Categories*			*Chi-Square*	*Level of Significance*
H		*A*	*B*	*C*		
	Expected Outcomes					
2·1	Desirability	157	67	10	140·9	< ·01
	Broad Topics					
2·2	Suitability	134	83	17	83.23	< ·01
	Learning Experiences					
2·3	Desirability	125	93	16	80·45	< ·01
2·4	Practicability	47	132	55	56·49	< ·01
2.5	Provided or not	17	55	162	145.00	< ·01
	Evaluation Devices					
2·6	Desirability	106	106	22	0·32	< ·01
2·7	Practicability	43	140	51	74·33	< ·01
2·8	Used or not	19	71	144	101·1	< ·01

df=2

aspects of the model. A comparison of the responses obtained empirically from the experts and the teachers pertaining to the above four hypotheses showed little difference between the two in each category.

Hypotheses H-4, and H-7 in Objectives 1, 2 and 3 were moderately confirmed meaning thereby that the majority of teachers consider highly desirable learning experiences and evaluation devices as moderately practicable only. So far as learning experiences are concerned, factors like paucity of equipment, lack of technical know-how, absence of funds and facilities and lack of freedom might have influenced the ratings of teachers. Regarding the practicability of various tools suggested in the model, the teacher's judgement might have been influenced by practical difficulties like heavy syllabi, system of examination (dominated by external written tests), the lack of training to construct tests and the use of various evaluation devices and above all the lack of freedom to try out new tools of evaluation.

Hypotheses H-5 and H-8 in Objectives 1, 2 and 3 were lowly confirmed suggesting thereby that the teachers neither provided learning experiences nor used various evaluation devices frequently in the teaching of social studies. As the data indicated, it was interesting to note that the teachers poorly implemented the programme of social studies even though they agreed highly with the theoretical part of it.

REFERENCES

Department of Extension Services, Teacher's College, Mysore. *Evaluation Workshop in Geography.* Brochure No. 15, 1959'

Department of Extension Services, Teachers' College, Mysore. *Resources Units in Social Studies,* Brochure No. 32, 1964-65.

Director of Public Instruction, Andhra Pradesh. *The Andhra Pradesh Gazette,* Hyderbad, 1966.

Director of Public Instruction in Mysore. *Higher Secondary Curriculum,* Bangalore, 1964.

Drassel Paul, L. Evaluation in social studies. *37th Year Book of National Council for Social Studies,* N.E.A., Washington, D.C. 1962.

Education Department, Kerala. *Syllabi for Secondary Schools,* Trivendrum, 1962.

Government of Madras. *The Fort St. George Gazette,* Madras, 1965.

Murray, Thomas, R. *Judging Student Progress,* David McKay Co., Inc., New York, 1960.

National Council of Educational Research and Training. *Social Studies —A Draft Syllabus for Classes I to XI,* New Delhi, 1965.

National Council of Educational Research and Training. *Position of Social Studies in India,* 1964.

National Council of Educational Research and Training. *Evaluation of Social Studies,* New Delhi, 1960.

National Council of Educational Research and Training. *Regional Colleges Unit—Plan and Courses of Study* (Demonstration Multipurpose Higher Secondary Schools), New Delhi, 1964

Walker and Lev. *Statistical Inference,* Holt, Rinehart and Winston, Inc., 1953.

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Changing Values Among Untouchables Through Education

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The authors have attempted to study how the untouchables in urban and rural areas perceive education in its role as an agent of social and economic change. The samples for the study were drawn from the urban and rural areas from Varanasi and the tool used was a structured interview schedule. The main finding is that the impact of education on the value orientation of the untouchables is not very significant.

In developed and developing societies education is regarded as an agent of modernization. India, like other developing countries, wants change and is already on the path of change. Education is regarded as a harbinger of social change, but before evaluating its role in modernizing a society or initiating social change we must understand the social system in which the system of education operates for education does not operate in a vacuum. If the social system emphasizes traditionalism then we will find education functioning as an agent of revivalism, reactionary tendencies and insularism. If the social system emphasizes rationality, scientific enquiry, humanism, then education will be looked upon as an agent of modernization. Thus the role of education differs from society to society on the basis of the commitment and definition of the goals of education. Its role is neither unilinear nor certain in initiating change.

Certain prerequisites have to be satisfied so that education may work as a modernizing force. It is necessary to have a constellation of certain attributes. The inculcation of rationality and the scientific spirit is very necessary. It is equally necesssary that there should be as much freedom as possible from the structural constraints characterised by the forces of the kinship, caste and particularistic loyalty. To release the mind from these constraints is an important prerequisite of modernity. A system of education having these goals is important for the inculcation of modernity.

In India, to keep pace with the changing pattern of industrial society and to develop a cosmopolitan and humanistic attitude of mind, the role of education is indeed great. Education has to define new situations and fulfil new demands characteristic of the emerging social order. On the one hand, there are the strong bonds of tradition; on the other, there are new cultural values and social situations. Education has to strike a balance between these two polarities of Indian society, i.e., tradition and modernity.

Though Indian society is on the path of change yet the important sector of the so-called untouchables has to go a long way on the road to modernity. Since Independence, the Government has done much for the welfare of the scheduled caste people. The administrative and legal machinery of the Government has been geared to provide facilities and conditions for their uplift. The law provides them certain social and economic protection, and the political machinery accommodates them. Education has been made to reach their doors by providing them free education at the elementary stage and providing financial assistance at the higher levels of education. Moreover, they have been given liberal concessions in the matter of admissions and reservation of seats. By providing all these political, legal, economic, social and educational concessions, it has been thought that they will catch up with the rest of the society on the road of prosperity and social reconstruction. It will also help to inculcate in them a sense of participation in the larger society and enable them to develop modern values in their life styles.

Education, which is considered to be the most important agent of social change in a desired direction, thus occupies a very important place in any programme of socio-economic welfare of the scheduled castes. This being so, a study of the attitude of the scheduled castes towards education and of their perception of the educational programme framed for their welfare will help us to understand the process of the assimilation of new cultural values in their life style. It will also help us to understand how far the expectations of the educational reconstruction programmes will be fulfilled so far as it is relevant to the scheduled castes. Their own appraisal of the role of the education in their community and individual life will help us to understand the general process of modernization in a microcosm of Indian society.

The present study conducted on a selected sample of the so-called untouchables in Varanasi district, aims to understand the process of assimilation of new values through education in their life. The study also aims to know their reaction to the new cultural values which are supposed to be transmitted by education to the members of their society and to find out their receptibility to the educational facilities provided to them.

METHOD

Sample

The sample for the present study comprised the untouchables of two villages of Varanasi district and two *mohallas* of Varanasi city. The to villages are: Lalpur-Toderpur which is situated 22 km. north-west from Varanasi city and Tara-Jeewanpur, 11 km. east-south from Varanasi city. The two *mohallas* of Varanasi city are Maldahiya and Dyauriabir. The total number of untouchables from the rural area (Lalpur-Toderpur), the suburban area (Tara-Jeewanpur) and the urban are (Maldahiya and Dyauriabir) was 150. Fifty untouchables from every area were chosen randomly to have equal proportions. The respondents from the above mentioned areas were selected taking due care of their socio-economic background, profession and education. To study the changing value-pattern of the 'untouchables'. the rural, urban and suburban background of the respondents were given due emphasis in the selection of the sample.

The study was conducted through a structured interview schedule. Some of the questions relevant for the present paper are given below.

1. In your opinion, what is the foremost aim of education?
   - (a) to provide economic security
   - (b) to provide social status in society
   - (c) to build a cultured personality
   - (d) to provide a good job
   - (e) any other
2. Do you want to provide higher education to your offspring?
   Yes/No/ any other.
3. From the following attributes of personality which one is most liked by you?
   - (a) to do one's work sincerely,
   - (b) to be ambitious,
   - (c) to be kind,
   - (d) active participation in social work,
   - (e) to be thrifty,
   - (f) to take interest in one's own work
   - (g) not to allow undue advantage of oneself to others.
4. Is the present education alienating the individual from the family?
   Yes/No/I cannot say.
5. In your opinion, will the present education be able to fulfil the ends of one's life?
   Yes/No/I cannot say.
6. The social status of the individual should be determined on the basis of higher education.
   Yes/No.

HYPOTHESIS

(a) It is hypothesised that untouchables perceive education more as a conservating agency of traditional values rather than as a transmitter of modern values.

(b) It is hypothesised that urbanised untouchables are more prone to modern values inculcated by education rather than the rural untouchables.

(c) It is hypothesised that education is perceived more as a status symbol in their community than an instrument of economic security.

FINDINGS

Untouchables and Aims of Education

The data given in Table 1 shows that untouchables from urban areas perceive personality development through education as the most important aim of education. The *Ss* of the suburban areas are of the opinion that education provides social status and a good job, respectively. The rural *Ss* perceive education mainly as a avenue of economic gains whereas these from the urban area are more concerned with the aesthetic and moral aspects of education. The above results are quite significant as shown by the value of chi-square.

TABLE 1

Distribution of Responses Pertaining to the Aims of Education

Ss from	*To provide economic security*	*To provide social status in the society*	*To build a cultured personality*	*To provide a good job*	*Total*
Urban area	5	10	35	0	50
Suburban area	3	24	4	19	50
Rural area	6	14	2	28	50
Total	14	48	41	47	150

Urban vs. Suburban $X^2=38.40$; df=3, p=.01
Urban vs. Rural $X^2=44.19$, df=3, p=.01
Suburban vs. Rural $X^2=6.02$, df=3, p=not significant

'Untouchables' and Higher Education

The data given in Table 2 show that *Ss* from all areas are in favour of higher education. This clearly indicates that they are in a position to understand the importance of education for their offspring. But the *Ss* of rural area, comparatively, are not in favour of higher education for their offspring. Such differences are statistically significant.

TABLE 2

Distribution of Responses Pertaining to Higher Education

Ss from	*Yes*	*No*	*Total*
Urban area	48	2	50
Suburban area	49	1	50
Rural area	38	12	50
Total	135	15	150

Urban vs. Suburban $X^2 = .34$, df. = 1, p=not significant
Urban vs. Rural $X^2 = 8.30$, df = 1, p=.1
Suburban vs. Rural $X^2 = 10.6$, df. = 1, p=.1

Untouchables and Attributes of Personality

The respondents were asked which charateristic of personality they liked most from among some major attributes of personality representing the dynamic as well as static personality system, which were posited before them. The distribution of responses as given in Table 3 shows that the respondents belonging to the urban area are more prone to such qualities of personality which are characteristic of the modern dynamic individual. Most of the urbanites believe in doing one's own work and participation in the social activities as the most important characteristic of human personality. Whereas the rural people like the virtues of benevolence as the most important characteristic of individual personality. Their belief in the traditional human virtue is in contradiction with the urban people's choice of social participation as the foremost characteristic of the individual personality. Suburban people show a liking for both modern, as well as traditional attributes of personality but their leaning is more towards the traditional characteristic of benevolence. The value of X^2 points out the significant difference.

TABLE 3

Distribution of Responses Pertaining to Attributes of Personality

Ss from	*To do one's work sincerely*	*To be ambitious*	*To be kind*	*Active participation in social work*	*To be thrifty*	*To take interest in one's own work*	*Not to allow undue advantage to others*	*Total*
Urban	15	5	2	20	1	4	3	50
Suburban	9	6	15	10	4	3	3	50
Rural	2	3	30	9	1	3	3	50
Total	26	14	47	39	6	10	9	150

Urban vs. Suburban $X^2 = 16.82$, $df = 6$, $p = .01$
Urban vs. Rural $X^2 = 40.70$, $df = 6$, $p = .01$
Suburban vs Rural $X^2 = 12.55$, $df = 6$, $p = .05$

Untouchables and Alienation

The respondents were asked whether the present education is alienating the individual from his family and immediate social surroundings. In all the three categories of the respondents, most of them are of the opinion that modern education is taking away the individual from his family. But more rural people, in comparison to the urban and suburban, think that education is an alienating factor from the immediate social set-up of the individual.

TABLE 4

Distribution of Responses Pertaining to Alienation due to Higher Education

Ss from	*Yes*	*No*	*Total*
Urban area	35	15	50
Suburban area	30	20	50
Rural area	45	5	50
Total	110	40	150

Urban Vs. Suburban $X^2 = 1.06$, $df = 1$, p=not significant
Urban Vs. Rural $X^2 = 6.26$, $df = 1$, $p = .05$
Suburban Vs. Rural $X^2 = 12$, $df = 1$, $p = .01$

Untouchables and Realization of Ends of Life

The distribution of data in Table 5 shows that the majority of the respondents from the urban and suburban areas believed that modern education is instrumental in achieveing the ends of life. But compared to the untouchables of urban and suburban areas, a significant percentage of untouchables from rural area think that modern education is unable to realise the aims of life. Perhaps because of their leaning towards traditional goals of rural life, they think that education is an impediment in the way of fulfifilling them. χ_2 value clearly points out the above said difference.

TABLE 5

Distribution of Responses Pertaining to Realization of Ends of Life

Ss from	*Yes*	*No*	*Total*
Urban area	45	5	50
Suburban area	41	9	50
Rural area	29	21	50
Total	115	35	150

Urban vs. Suburban $\chi^2 = 1.32$, df $= 1$, p =not significant
Urban vs. Rural $\chi^2 = 13.2$, df $= 1$, p $= .01$
Suburban vs. Rural $\chi^2 = 6.84$, df $= 1$, p $= .01$

Untouchables and Status Recognition

Status recognition and the basis of status are the most important concern of the untouchables. Downtrodden and subjugated, as they were, by the higher caste, on the basis of their low caste membership, the untouchables try to seek new bases of status hierarchy. The data given in Table 6 show that respondents from urban, suburban and rural areas equally agree that education should be the criterion of determining one's social status. But perhaps, due to the still pervading impact of caste hierarchy, there are still a good percentage of untouchables from rural area who believe that education should not be the determinant of social status of the individual.

TABLE 6

Distribution of Responses Pertaining to Status Recognition

Ss from	*Yes*	*No*	*Total*
Urban	38	12	50
Suburban	35	15	50
Rural	26	24	50
Total	99	51	150

Urban vs. Suburban $\chi^2 = .44$, df = 1, p = not significant
Urban vs. Rural $\chi^2 = 6.24$, df = 1, o = .05
Suburban vs. Rural $\chi^2 = 3.4$, df = 1, p = not significant

CONCLUSIONS AND SUGGESTIONS

The foregoing discussion of the data leads to the following conclusions.

1. The general picture which emerges from analysis of the data is that the impact, of education on the value orientation of the untouchables is not very significant. Their traditional social structure and life values are still a great impediment in the way of the modernization of their attitudes.

2. Whatever change is evident is mainly in the attitudes of urban untouchables. The rural ones are still very much conservative and dogmatic in their approach to the education. This fact is most significantly illustrated by their attitude towards higher education as the determinant of one's social status. There is a significant number of rural untouchables who think that higher education is not an important basis of status recognition. They think that modern education is unable to realise the ends of life. Caste-membership and economic affluence loom large in their mind; hence their apathy towards education as an important factor in the determination of social status.

3. The role of education in the development of human personality is also an important point on the attitudinal scale of the untouchables. They have chosen those attributes of personality as the product of education which are the characteristic of a traditional and stagnant personality. The dynamic attributes of the personality which

are characteristic of modern urbo-industrial society have still not been accepted by them. Similarly, the aim of education for them is mostly idealistic and rarely pragmatic.

Thus we find that the untouchables are still living deeply in their isolated little world which is largely the product of the traditional social structure and partly the creation of their own self. The educational uplift of the untouchables can only significantly materialise when there is an attempt by them to grasp the meaning of education and change in the modern society.

REFERENCES

Beteille Andre. The Future of the Backward Classes: The Competing Demands of Status and Power. In *India and Ceylon: Unity and Diversity*. Philip Mason (Ed.), Oxford University Press, London, 1967.

Cormack, Margaret L. *She Who Rides a Peacock*. New Delhi: Asia Publishing House.

Ghosh, S.K. *Education and Social Change: NEFA*. In *J. Soc. Res.*, Vol. XII, No. 1, March 1969.

Lakshmanna Chintamani. Abolition of Untouchability in Andhra Pradesh. In *Social Welfare*, Vol. XV, No. 2, May 1968.

Report of the Education Commission, (964-66). Ministry of Education, Government of India, 1966.

Sriniwas, M.N. *Caste in Modern India And Other Essays*. New Delhi, Asia Publishing House, 1962.

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Research on Creative Functioning in India : A Review

M. K. Raina

The author traces the history of research on creativity and discusses research in this field in India from the earliest beginnings to date. He focusses in detail on the following subject areas: child and adolescent creativity, teacher perception ,and teacher creativity, artistic and creative musicality, creativity in industry, and adaptation of creativity instruments.

Creativity, as yet, does not face any danger of being "tossed upon the junk heap of discarded educational fads" (Treffinger, Renzulli and Feldhusen, 1971) in India. Probably there has been no loose bandying around the word and people have yet to characterise it as a 'fashion' in tune with the latest in vogue. It will take it, perhaps, some time to become what some uniformed eccentrics may unjustifiably call a 'fad'.

Researching or searching the area of creative mental functioning is not important because the person working shall be called a fashionable researcher, but because it shall tell more about how to respect and develop this potential which is mankinds' greatest asset (Toynbee, 1963), and a quality which is vital to the shaping of man's future

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1964). It is, perhaps, because of this that a committee of
en leading psychologists placed creativity and its cultivation at
of a list of areas deserving the highest research priority in the
oural sciences (P. Smith, 1959).
ere has been a rapid upsurge of research on creativity and one
what Parnes and Brunelle (1967) call the 'bibliographic explo-
this field. "Approximately 1250 bibliographic entries on crea-
ave appeared in the last year and one-half. A rough but dra-
indication of the explosion of literature on creativity is that in
ulk the research from January 1965 to June 1966, equals that
preceding ten years, and that again balances the work of the
ing one hundred years. The number of relevant doctoral dis-
ns is a particularly good qualitative barometer of this interest
tivity. About 300 such reports existed prior to 1965; in the last
nd one-half almost 200 new dissertations have been recorded,
diverse headings in a variety of disciplines (Parnes and Brunelle,
A similar phenomenon was presented by Guilford (1970) at
th Annual Creative Problem Solving Institute at the State Uni-
College of New York at Buffalo. The following table present-
him shows remarkable gains in creativity research during pre-
years.

TABLE

umber and Percentages of Titles of Psychological Publications Devoted to Creativity by Five-Year Intervals from 1928 to 1967

id Year	*Total Number*	*On Creativity*	*Per cent on Creativity*
1930	24,067	29	0.12
1935	30,494	40	0.13
1940	30,043	62	0.26
1945	21,392	34	0.16
1950	34,324	43	0.13
1955	43,931	53	0.12
1960	41,317	177	0.43
1965	66,314	474	0.71

he above table indicates that number of publications per five-year
al both for the titles of creativity and for the total number of
The table quite clearly shows how things have happened to
ity. There is an upward trend in the research.
esearch and development concerning creative functioning is quite

elementary and fragmentary in India (Raina, 1971). It has been of very small dimensions carried mostly by isolated individuals. The extreme paucity of research attempted in the field becomes evident upon a review of studies purporting to belong to it. There are hardly any that may be regarded as serious attempts to understand the creative process or the act of creation or its various ramifications. Such studies as these are, except a few, are elementary and amateurish in character and do not come upto the required standard of scientific rigor (Raina. 1969a). Many reasons may be suggested for this neglect of the study of creativity and its development, chief among them may be mentioned the lack or unavailability of the necessary measuring instruments, or the failure to understand and appreciate the role of creative functioning in the various endeavours of life, and the complex nature of the study of creativity. Raychaudhuri (1966b) has also proposed some more reasons. Few educationists and psychologists at the universities have devoted themselves to extensive studies in this field. Following sections are devoted to brief summaries of the various researches done here in India.

Studies on Child and Adolescent Creativity

Perhaps there has been, relatively speaking, greater preoccupation with studying creativity in adolescents than the children, and very few long-term studies are available about the development of this ability in children or adolescents. A number of studies have been concerned with the link between creativity and some other factors, particularly achievement, intelligence and personality. One of the earlier studies by Phatak (1962) using the Baroda experimental school children and Minnesota Tests of Creative Thinking found that creativity as thus measured was significantly associated with intelligence quotient but was unrelated to school achievement. Lalitha (1956, 1957) made an attempt to study the development of imagination in children between the ages of 8 to 11. For this purpose, data were collected from 120 girls and 30 boys of Madras, by administering the Rorschach test. From the analysis of the data collected, it was found that there was no significant relationship between age and contents of imagination, that there was no sex difference in the contents of imagination in the age group ten, that socio-economic status had no influence on the performance of the group tested, that as age advanced, there was tendency to be more imaginative, that habits of living and fathers' occupation, and other environmental factors seemed to have no real influence upon the contents of imagination.

Using Rorschach as a measure of imagination, Das (1957, 1959) studied the students of higher forms—fourth, fifth and sixth of the four high schools in Madras city. The responses were analysed in a number of specific ways. From the present study it was found that there was no salient and significant difference between the students belonging to IV, V and VI forms with regards to contents to imagination; there was no marked difference of imagination fertility in the age groups between 13 and 16; there was slight sex difference in imaginative contents between boys and girls of age groups varying from 13 to 16; the socio-economic status of the family had no influence on the imagination of the pupils; imagination seemed to be independent of intelligence of pupils; older pupils of these age groups, saw more movements in the blots than the younger ones, boys were more critical and saw more human details in the blots than the girls. This study also showed that girls possessed more creative imagination than boys which was revealed by their movement responses. Some more studies are available on imagination and its development by Sathe (1960); Raman (1959) and Shyamala (1961).

Raina (1968b) designed his doctoral dissertation to compare significant differences between high and low creative groups on slected measures of cognition, personality and socio-economic status. Based on scores achieved on the criterion measure, the Minnesota Tests of Creative Thinking, administered to a total population of 500 students of three educational zones of Rajasthan, one hundred high and one hundred low were delineated. Only ninety in the former group (high creative) and 85 in the latter (low creative) were available for the final analysis. The sample came from 17 schools of the three educational zones. They were subsequently assigned to four groups. Analysis of the results of this investigation revealed significant differences between the IQs of the two groups, differences being in the favour of high creative. A comparison of the high creative males with the low creative males elicited significant differences between the IQ group means. Mean performances of the high creative females and low creative females also revealed significant differences between group IQ scores. In both the cases, the high creative scored higher. No significant dissimilarities were evidenced between high creative male and female and the low creative male and female groups. High creative students scored significantly higher than the low creative with respect to academic achievement. More specifically in Class VIII, the high creatives, by and large, scored signficantly higher than the low creatives in English and mathematics. The high creative subjects exhibited greater achievement, autonomy, dominance, change and endurance than the low creative subjects. High creative females were higher in change and endurance than the high creative males, but the latter were higher in heterosexuality. The high creative males showed greater achievement, autonomy, dominance, change, endurance and aggression than the low creative males. The low creative males exhibited greater deference, affiliation, succorance, abasement and heterosexuality. The high creative females were significantly higher than the low creative females on achievement, autonomy, dominance, change and endurance, but the latter were characterized by deference, order, affiliation, succorance and heterosexuality traits. The low creative males showed greater exhibition, affiliation and heterosexuality and low creative females scored significantly higher than the low creative males on achievement, dominance, change and endurance. Low creative group gave evidence of significantly greater anxiety than the high creative group. Significant differences were noted in the socio-economic status of the high creative and low creative on all three dimensions of the socio-economic status scale used.

Pareek (1966) made an investigation with the purpose to study the development of creative thinking at different age levels and to study the relationship between creative thinking and other factors. The author records that it is quite evident from the data that the mean creative thinking scores increased with the increase in age. Coefficient of correlation between creative thinking scores and IQ scores (on performance test) for the entire sample came out to be .81. The coefficient of correlation between creative thinking scores and IQ scores (on verbal test) for the entire sample was .74. The results on the basis of available data, the author observes, in this study lead to "assume that intelligence has a definite role to determine the habits of creative thinking, as revealed by this investigation". The data available showed that there was *hardly* any significant difference in creative thinking between boys and girls. This study showed that socio-economic status had quite a significant role to play to determine the creative thinking. Significant relationship of .50 was found between class teacher rating scores and creative thinking scores. The results of this study "indicate that the scholastic achievement has some sort of relationship with creative thinking". Significant and positive coefficients of correlation were found between free hand drawing, completion of stories and creative thinking scores.

Using 120 boys and girls of Rajasthan, Mishra (1969) designed his study to find relationship of pre-adolescent creative expression in art and Hindi at different age levels with other relevant factors These 120 students were selected out of 255, retained because "they had scored high on Creative Situation Test and had at least reasonable intelligence and personality adjustment". It has been shown that with the increase in age certain potentialities tend to increase. The investigator found .08 coefficient of correlation between Hindi story and creative expression; .11 between creative self-expressional drawing and creativity, .08 between personality adjustment and creative situations, .28 between Creative Situation Test and Verbal Intelligence Test. Suwania (1969) attempted to study ceratívity among science and arts students of Class X (22 science and 22 arts) matched for age, sex, class, IQ, socio-economic status, scholastic achievement and environment. The investigator concluded that contrary to the popular belief, arts and science students were not found to differ significantly in the creative abilities, relationship of all the factors of creativity was found to be negligible with achievement in science subjects "that meant to be highly creative did not necessarily imply to be a high achiever". Further, the investigator concluded that almost all factors of creativity were found to be negatively related to the achievement in arts subjects though the correlations were not significant.

There are some other studies (Chandokar, 1961; Manjunathaiah, 1965; Phatak, 1959; Sharma, 1964; Raman, 1959; Paramesh, 1969) which have dealt with the relationship between various dimensions of creativity and other correlates. Goyal (1969) made a study of some personality traits of creative children at the middle school stage of Patiala district in Punjab. Using his own valid and reliable tests of creativity developed on the lines of Torrance, he concluded that creative pupils at the middle school stage possessed a higher level of energy, rejected repression and suppression for the control of impulses, were more of introverts, were more independent in both thought and action, had open minds, could tolerate ambiguity and entertained opposing values.

Paramesh (1970a) tried to study the value orientations of creative persons with 107 senior high school American whites of both sexes of the State of North Carolina as his subjects. The Revised Art Scale (RA) derived by Welsh from the original Barron-Welsh Art Scale (BW) was used to identify the degree of creativity. The Study of Values by Allport, *et. al.*, was used for gauging the value orientation of the subjects. The results indicated that the high, moderate and low creative groups differed among themselves only with reference to economic value. The high creative group was significantly low on economic value as compared with the low as well as moderate creative groups. The moderate and low creative groups did not differ between themselves with respect to economic value.

Recently, Singh (1970) made a cross-cultural study of creative abilities in Indian and American children. Data were gathered from Banaras and Tempa. The hypothesis that there would be significant differences in measures of the components of creativity between advantaged and disadvantaged children, regardless of culture, was partially substantiated. There were significant differences at .05 to .01 level in favour of advantaged children on flexbility (performance), originality (verbal), and originality (performance) and in favour of disadvantaged at .05 to .01 level on redefinition (verbal), redefinition (performance), fluency (verbal), sensitivity to problems (performance), and elaboration (verbal). There were no significant differences found on fluency (performance), sensitivity to problems (verbal) and elaboration (performance). The investigator further records that it appears that disadvantaged children, regardless of culture, (a) do not necessarily score low on the verbal part of the creativity test, and (b) with an increase in socio-economic status, abilities such as flexibility and originality, excel at the cost of redefinition, fluency, sensitivity to problems, and elaboration.

Two studies in India on the effect of competition on fluency and creativity and one on the effect of training in creative problem-solving on fluency of thinking, are available. The first two studies (Raina and Chaturvedi, 1968; Raina, 1968a) on the effect of competition demonstrated that competition affects ideational fluency and creativity favourably. The second experiment, which was of an exploratory nature in India was designed to test the effectiveness of the creative problem-solving course using brain-storming and related procedures (Raina and Chaturvedi, 1970). The hypothesis that the methods employed in the course would produce a significant increment in the fluency or the *quantity* of ideas was supported. This study was more or less a replication of the earlier studies but should provide information concerning the appropriateness of the principles in an Indian culture.

Raina (1969c) attempted to study the effects of school environment on creativity using Torrance Tests of Creative Thinking with 120 students of VIII through X Classes of four higher secondary schools (one high creative male school, one low creative male school, one high creative female school, and low creative female school) in a city. Using analysis of variance technique, it was found that students from high creative school (both male and female) scored significantly higher than the students from low creative schools (both male and female). The results, it was observed, lend indirect support to the validity of the creative thinking instruments used. In another study, Rania(1969b) tried to study the comparative performance of boys and girls on the tests of creativity using 180 subjects (90 males and 90 females) of VIII through X Classes of higher secondary schools of Ajmer. The results of this study showed that males are more creative than females on the figural tests and on the parts of the verbal form. Further investigations of the sex difference in creativity for different populations were suggested. The findings of this study are corroborated by the findings of Prakash (1966), and Strauss and Strauss (1968) using Indian subjects.

Studies on Teacher Perception and Teacher Creativity

In this country, teachers' and teacher educators' perception about the most desirable and least desirable traits of an ideal pupil has been studied by Phatak (1964), Raina (1970g), Raina and Raina

1971). All of these studies have used Torrance's Ideal Pupil Checklist as the research instrument. Phatak's study showed that the essential qualities of an ideal pupil according to her subjects should be: curious, does work on time, obedient, a self-starter, self-confident, healthy, courteous. The Baroda teachers of her study considered the following traits as punishable: disturbs class organisation, stubborn, fault-finding, talkative, spirited in disagreement, regresses occasionally, negativistic. Raina's study using 40 prospective science teachers showed that they eulogised traits like curiosity, obedience, working on time, remembering well, self-confident, healthy, adventurous, attempts difficult tasks and courteous. They wanted to discourage such qualities as; disturbs class organisation, non-conforming, negativistic, stubborn, talkative, critical of others, bashful, spirited in disagreement and fault-finding. The males and females differed in their perception regarding the most valued traits of an ideal pupil. This study showed that there was a complete variation in the perceptions of the 'creativity experts' and the prospective science teachers Prospective teachers, it was observed, encouraged conformity, obedience and non-creativity. Raina and Raina (1971) designed a study to determine what concepts teacher educators in India have of the ideal student in terms of what characteristics they believe should be encouraged and discouraged and to compare the results with the concepts of teachers in the United States. When the 62 characteristics of checklist were ranked, a rank order coefficient of correlation of .76 was obtained between the ranks assigned by the Rajasthan teacher educators and United States teachers. In general, the Rajasthan subjects emphasized the receptive nature of man and deemphasized man's self acting nature more than United States teachers.

Using Information Awareness Checklist, by Williams (1966) with slight modifications, Raina (1970e) attempted to study the teacher educator competency in creativity. Teacher educators of seven colleges of education of two States were studied and the results showed that the sample teacher educators, by and large, did not possess sufficient knowledge or they were not sufficiently aware about the creativity and creativity movement in the field of education and psychology. Most of the teacher educators were aware of the fact that their classrooms needed innovations and most of them were least aware of the creativity training programmes.

In order to understand the dynamics of creative behaviour in teachers, Raina studied some teachers who were under training at the Regional College of Education, Ajmer. A study (Raina, 1970f) of creativity in teachers was made using Torrance Tests of Creative Thinking with 55 teachers with a view to find out sex differences in creative thinking ability, relationship between creativity and age and relationship between creativity and years of teaching experience. The results showed that there were no significant sex differences in various factors of creativity except in non-verbal originality, the relationship of age with fluency was negative and not significant, with flexibility and originality it was positive and not significant, with elaboration and total creativity it was positive and significant. Further, the relationship of years of experience with fluency and flexibility was negative but not significant, with originality, elaboration and total creativity it was positive but not significant. In addition, one more attempt (Raina, 1970i) was made to study the sex differences in creative functioning using both verbal and non-berbal instruments. The findings of this exploratory study suggested that there were no significant sex differences in creative thinking ability in teachers as far as verbal creativity was concerned. Further, this study suggested that males scored significantly higher on originality dimension of the non-verbal form of the creativity instrument and except this dimension of creativity, there were no significant sex differences.

Creative, critical and power motivations as measured by personal-Social Motivation Inventory developed by Torrance were also studied using high creative and low creative teachers identified on the basis of Torrance's tests. The results (Raina 1970d) showed that the creative group scored significantly higher than the low creative group on the creative motivation scale, low creative group scored significantly higher than the high creative group on the critical motivation scale and that there was no significant difference between the two groups on power motivation scale, though low creative showed a slight edge over high creative. Using Ask-and-Guess Test and Product Improvement Test and scores on the three scales of the Personal-Social Motivation Inventory, it was found (Raina, 1970c) that ideational fluency was positively and significantly related to the creative motivation and secondly, critical motivation and power motivation were found to be significantly related. Though no negative correlations were found, the relationship between fluency and other two scales were found to be low and positive and not significant.

Relationship between anxiety scores and the various factors of creativity as measured by Torrance's test was studied (Rania, 1970h). The correlations between the anxiety scores and the various dimensions of creativity namely fluency, flexibility, originality and elaboration and total creativity score did not reach the level of significance but the correlations, by and large, except between fluency and anxiety in males, and flexibility and anxiety in the total group, were extremely low and negative. When correlations between anxiety and various measures .of creativity were computed for the top twenty per cent high-anxious group and the lower twenty per cent low-anxious group, correlations were low and negative except for flexibility and originality in the case of high-anxious group. The difference between the means of the high-anxious and the low-anxious group for the different factors was not significant, but, in every case except originality, the high-anxious group scored higher than the low-anxious group. The results of this study, it seems, are rather generally in line with similar studies similarly analysed.

Imagination and creativity as factors in teaching success have been studied by Dosajh (1960, 1966) and Raina (1970b) respectively. Dosajh reported .71 as the coefficient of correlation between levels of imagination on Horn-Hellersberg Test and levels in skills in teaching, .80 as the coefficient of correlation between levels in maturity on H.H. test and levels in skills in teaching. The results, it has been pointed out, proved the hypothesis that imagination and maturity as measured by H.H. test were indicative of success in teaching. Raina explored the relation among various measures of non-verbal form of Torrance's tests and total teaching practice marks for 55 subjects. Positive but not significant relation between fluency and teaching practice marks (r=.127) flexibility and teaching practice marks (r=.171), total creativity scores and teaching practice marks (r=.2163) was found. The relationship between originality and teaching practice mark was found to be negative and not significant (r=.055). The relationship between elaboration and teaching practice marks was found to be positive and significant (r=.340).

Studies on Artistic and Creative Musicality

Perhaps the most ambitious, well designed and well thought out studies in India deal with artistic and creative musicality. Raychaudhuri and Ganguly have studied the phenomenon of creativity in the field of music. "They have made a serious effort to find out its distinctive features and also the factors which shape it." Raychaudhuri (1962) designed his doctoral thesis to study mainly the personality characteristics of a group of successful Indian musicians. The investigations made use of a battery of projective personality measures—the Rorschach, Thematic. Apperception Test, the Szondi Test and also a quasi-structural life history interview for gleaning the relevant data. The subjects were 30 professional musicians who were 'nominated' as creative by three experts of music. The test performance of the musicians group were compared with those of a group of thirty non-musicians—persons employed in various non artistic vocations. Within the limits of the sample size, the investigation established the following findings: the personality structures of the creative musicians is strikingly different from that of the non-musical control subjects matched for sex, age, education, race, socio-cultural background and intelligence. Statistically speaking, the difference has been found to be significantly greater than chance; the creative musician was more distinctly marked by his emotional and temperamental characteristics than by cognitive and motivational aspects of his personality structure, the role of hereditary factors in the life of the successful musician has not been found to be so decisive as the other factors of development—the familial and socio-cultural field forces appeared significant and selective in their lives. Raychaudhuri (1962, 1963a, 1963b; 1965) in a number of investigations utilized the Rorschach, T.A.T., Szondi, developmental data and clinical ratings to explore the personality structure of different levels of creative subjects. He has thoroughly examined the usefulness of different projective tests and has arrived at the conclusion that a multi-dimensional approach involving the use of projective tests and life-history interview should be undertaken so as to reveal the nature of artists' personality. His exploratory study of 25 incipient musicians, painters and litterateurs with the help of the T.A T., Szondi and Welsh Figure Preference Test (WFPT) has shown that artists (1) have depression through their childhood, (2) have strong oedipal attachment, (3) are basically dependent upon the submissive individuals with low need for physical activity, (4) have high degree of sensibility, (5) have vivid fantasy life, a tendency for dreaming and ability for playful 'prelogical' thinking, and (6) have the capacity to channelize their aggression into sublimated actions.

Further, Raychaudhuri (1965) has also studied the early experiences and developmental data of Indian and American musical artists and has isolated the following crucial factors in the biography of creative persons: unhappy and discomforting home environment, relative feelings of isolation, alienation and loneliness pointing to egocentricity, experience of parental discord, distance from, and discord with father and intimacy with mother. Raychaudhuri (1966b) undertook a study to test the perceptual preference pattern and creativity in musical artists. He recorded that musical artists consistently did better in the RA scales of the test as compared to the non-artists. The hypothesis that no appreciable difference would be revealed in the perceptual preferences of the two groups of artists was rejected. In addition, Raychaudhuri and Ganguly (1964) examined "the developmental data of the musicians and have documented information so close to Eiduson, Nash and Taft."

Bhattacharyya (1956, 1960a, 1960b, 1961) studied the personality of the artists (painter) and has isolated the following psychological qualities of the painting artists: intelligence, constructive capacity, relative ideas of form and depth, confidence, sociability, spontaneous reaction to stimulation, etc. In an investigation with 20 well-known Indian painters it was found that the subjects with latent or manifest artistic skills were introvert from childhood. The artists who acquired the above skill in later stage through environmental influences were found to be extrovert. The study has demonstrated that the sex differences and religion did not play any significant role in creative activity.

Ron Maduro (Kagal, 1970) is doing his Ph.D. dissertation to be completed at the University of California, Berkeley, on the nature of creativity, attributes of creative person, factors fostering or inhibiting development of the creative process. Of the 40 painters of Nathdawara, Rajasthan, Maduro says, "the more creative ones have a higher self-image, a sense of doing something different—and of knowing it. They are not as stereotyped with respect to religious and social taboos. For the less creative, religion exists in an unambiguous way, it maps out their lives for them. But the better painters have a greater sense of personal ethics, and are not so mechanistically involved in religious ritual". The creative painters, Maduro observes, tend to express themselves more openly, to talk more freely. There is also a marked difference in work habits. According to Maduro, the creative person takes himself very seriously, works very hard, but is less regular. Creative painters generally chose a symmetrical forms to geometrical ones. This led the investigator to believe that "the essential nature of creativity is much the same everywhere".

Study on Creativity in Industry

In order to study the relationship between social introversion and creativity, Paramesh (1970b) used Social Introversion Scale drawn from the MMPI with 38 personnel at the junior management level in an industry at Madras. These persons were rated on a 10-point rating scale for their creative ability as judged by their immediate superior executive. On the basis of the creativity ratings these persons were divided into three groups: high, middle and low. The high and low creativity groups consisted of the top and bottom 27 per cent of the individuals based on their ranks for creativity. The remaining individuals constituted the middle group. The results indicated that there was no significant difference among the high, middle and low creativity groups so far as social introversion was concerned. The three groups were homogeneous sharing the same degree of social introversion. Similar results were obtained by Paramesh (1968) in a large study employing 216 high schools boys in Madras City.

Study on the Adaptation of Creativity Instruments

Recently Paramesh (1971) has attempted to adopt the Wallach and Kogan instruments of creativity to the Indian conditions and to test the relationship between creativity and intelligence. In order to find out the reliability of the instruments, 100 adolescents from three

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high schools from the city of Madras were used. Two approaches were made for establishing the reliability of these instruments by calculating odd-even split-half reliability using Spearman-Brown formula as well as item-sum correlations. The results showed that the Wallach-Kogan creativity instruments possessed a good degree of stability and internal consistency. Creativity as measured by these instruments has been found to have no relationship with intelligence. The results showed that the high, moderate and low creativity groups did not differ in their mean age. "Hence, in the present study, the results obtained may be taken as not mediated by age".

Studies on Research Productivity

McPherson (1967) observed that "while it may be argued that publications do not represent creativity, we maintain that there is no creativity without productivity of some kind. One form of production is "to publish". This kind of production has been the subject for research for Dwivedi and Chandra (1967), Rangarao (1967), and Raina and Chaudhuri (1970). Study by Dwivedi and Chandra was undertaken with a view to assess the relationship of productivity with need achievement, social value, years of research and level of aspiration in scientists of U.P.

Productivity was found to be significantly and positively related with need achievement and level of aspiration. Taking the variables correlated, it was found that productivity as measured by the number of publications, was not significantly related with social value. However, on correlating productivity with need achievement, a high positive correlation was found in categories II and III (senior scientific officers and readers, junior scientific officers and lecturers), the coefficients were .89 and .81 respectively. Productivity was also correlated with research experience. A significant and positive correlation was found only in category II ($r=.55$) which means that "productivity increases with the increase in years of research experience, however, this can not be generalised for whole population as in two-thirds of our sample the two variables are not significantly related".

Rangarao (1967) made an attempt to study the overall activity in research as indicated by publications in technical journals. The survey was confined to all the publications released in one year as abstracted in the *Indian Science Abstracts.* This comprehensive research deals with contributions by different institutions, productivity per scientist in scientific and technological laboratories in different fields throughout the country and to find out the optimum size, subject-wise distribution of research productivity, multiplicity of authorship, productivity of publications and contribution to foreign journals. Among the universities, there was marked difference in research activity. There were 13 universities from which more than 100 publications were contributed during the year under analysis. They were neither the oldest nor had better financial grants than others. "Research tradition," observes Rangarao, "cannot be thus explained by age or attractive salaries."

Research productivity of the doctorates of the University of Indore was sutdied in relation to age, years of teaching experience at graduate and post-graduate levels, and years of research experience, by Raina and Chaudhuri (1970). The results revealed that those doctorates who received their Ph.D. in the Faculty of Arts (English, political science and economics) and Faculty of Commerce did not have any research productivity. Doctorates in the Faculty of Science showed some productivity particularly in zoology and mathematics. Faculty of Engineering seemed to be comparatively most productive. Two subjects in the Faculty of Engineering out of the whole sample had shown some originality as they had produced research papers entirely independent of their Ph.D. thesis. The coefficients of correlation between age and productivity came out to be .084, not significant; between graduate, post-graduate teaching experience and productivity .296 and .230 respectively, not significant; .284 between years taken in completing the Ph.D. and productivity, not significant. This study seems to support the contention that "researchers are researchers only for a shortwhile".

In spite of the fact that the area of mental functioning symbolized by creativity has been intensively and extensively explored by the researchers, and of late, there has been some sort of hyperactivity as well, but it still "is not noted for its conceptual clarity" (Parsons, 1971). Unfortunately, at the moment there is no broad agreement among researchers about the nature, process and components of creative functioning. This lack of consensus about what constitutes creativity can be attributed to the "basic philosophical differences among workers in this area" (Yamamoto, 1965). Whatever the philosophical predilections of the workers may be, Professor Calvin Taylor (1964) has a point when he remarks that there is no longer any question that fruitful research can be done because "creativity, is after all a large but embryonic field filled with unknowns". The need is to answer many unsolved problems about this many-faceted topic, otherwise the concept of creativity may become what Treffinger, *et. al.*, call "a catchall".

REFERENCES

Bhattacharyya, P.S. A psychological study of the artists. Unpublished masters thesis. University of Calcutta, 1956.

Bhattacharya, P.S A psychological study of the artists. *Proceedings of 47th Indian Science Congress,* Part III (Abstract), 1960a.

Bhattacharyya, P.S. Personality composition of the artist (painters). *Ind. J. Psychol.,* 1960b, 35, 103-108.

Bhattacharyya, P.S. An experimental study of artists' personality. *Procedings of 48th Indian Science Congress,* Part III (Abstract), 1961

Chandokar, L. To study creative thinking in early school years. Unpublished masters thesis. University of Baroda, 1961.

Das, Rabindra. A study of imagination in high school students. Unpublished masters thesis. University of Madras, 1957.

Das, Rabindra. A study of imagination in high school students. *Journal of Education,* 1959, 3, 18-33.

Dosajh, N.L. *Imagination and Maturity as Factors Indicative of Success in Teaching.* Chandigarh: Government College of Education, 1960.

Dosajh, N.L. Imagination and maturity as factors indicative of success in teaching. *Ind. J. Psychol.,* 1965, 40, 81-84.

Dwivedi, N.P., and Chandra, S. Some correlates of productivity in scientists. *Ind. Psychol. Rev.,* 1957, 4, 35-48.

Goyal, R.P. A study of some personality traits of creative children at middle schol stage. Unpublished masters thesis. University of Aligarh, 1969.

Guilford, J.P. Creativity: retrospect and prospect. *The Journal of Creative Behaviour,* 1970, 4, 149-168.

Kegal, C. The Painters of Nathdwara: An anthropologist investigates the nature of creativity among the painters of Nathdwara. *Span.* 1970, 9, 2-7.

Lalitha, M.S. A study of the development of imagination in children. Unpublished masters thesis. University of Madras, 1956.

Lalitha, M.S. A study of the development of imagination in children. *J. Psychol. Res.,* 1957, 2, 30-48.

Manjunathaiah, B.N. A study of fluency among the high school students. Unpublished masters thesis. University of Mysore, 1965.

McPherson, J.H. Comment. *The Creativity Review,* 1957, 2, 16.

Mishra, D.N. A study of pre-adolescents' creative expression in art and Hindi at different age levels and their relationship with other relevant factors. Unpublished masters thesis. University of Rajasthan, 1969.

Paramesh, C.R. A study of creativity in relation to extraversion, emotionality, body image and values. Unpublished doctoral dissertation. University of Madras, 1969.

Paramesh, C.R. Value orientations of creative persons. *Psychological Studies,* 1970a, 15, 108-112.

Paramesh, C.R. Creativity in industry. *J. Psychol. Res.,* 1970b, 14, 68-72.

Paramesh, C.R. Adaptation of Wallach and Kogan creativity instruments and the relationship between creativity and intelligence. *Ind. J. Psychol.* 1971, 46, 1-11.

Pareek, S.S. An investigation into creative thinking of the students at different age levels and the relationship between creative thinking and other related factors. Unpublished masters thesis. University of Rajasthan, 1966.

Parnes, S.J. and Brunelle, E.A. The Literature of Creativity (Part 1). *The Journal of Creative Behavior,* 1967, 1, 52-105.

Parsons, M.J. White and black and creativity. *Br. J. Educl. Stud.,* 1971, 19, 5-16.

Phatak, P. A critical investigation into the creative activities of high school pupils. Unpublished masters thesis. University of Jabalpur, 1959.

Phatak, P. Exploratory study of creativity and intelligence and scholastic achievement. *Psychol. Stud.,* 1962, 7, 1-9.

Phatak, P. Teachers' concept of an ideal student. *J. M.S. Univ. Baroda,* 1964, 13, 49-62.

Prakash, A.O. Understanding the fourth grade slump: a study of the creative thinking of Indian students. Unpublished masters thesis. University of Minnesota, 1966.

Raina, M.K. A study into the effect of competition on creativity. *Gifted Child Quarterly,* 1968a, 12, 217-220.

Raina, M.K. A study of some correlates of creativity in Indian students. Unpublished doctoral dissertation. University of Rajasthan, 1968b.

Raina, M.K. Creativity Research in India: Analysis. *The Journal of Creative Behaviour,* 1969b, 3, 111-114.

Raina, M.K. An exploratory study of school climate and creativity. Unpublished research report, 1969c.

Raina, M.K. Some issues in creativity research. Unpublished paper, University of Indore, 1970a.

Raina, M.K. Creativity and teaching success. *Psychol. Rep.,* 1970b, 26, 70.

Raina, M.K. Ideational fluency and motivations of teachers under training *Ind. J. Psychol.,* (in press).

Raina, M.K. Creative, Critical and Power motivations of high and low creative students. *J. Psychol Res.,* 1970d, 14, 107-112.

Raina, M. K. Teacher educator competency in creativity. Unpublished research report, University of Indore, 1970c.

Raina, M. K. *A study of creativity in teachers.* Psychol. Stud., 1970f, 15, 28-33.

Raina, M. K. Prospective science teachers perception about ideal pupil. *J. Res. in Science Teaching.* 1970g, 7, 169-172.

Raina, M. K. An exploratory study of anxiety and creativity in teachers. Unpublished research report, 1970h.

Raina, M. K. Verbal and non-verbal creative thinking ability: A study in sex differences. *J Edu. & Psychol.,* 1970i (in press).

Raina, M. K. Research developments in creativity in India. *J. Res. & Development in Edu.,* 1971, 4, 118-128.

Raina, M. K., and Chaturvedi, S. C. Effect of competition on ideational fluency. *Ind. J. Exp. Psychol.,* 1968, 2, 50-52.

Raina, M., and Chaturvedi, S. C. Effects of training in creative problem solving on fluency of thinking. *Ind. J. App. Psychol.,* 1970, 7, 71-74.

Raina, M. K., and Chaudhuri, U.S. Research productivity of doctorates. *Psychol. Stud.* (Submitted), 1970.

Raina, T. N., and Raina, M. K. Perception of teacher educators in India about the ideal pupil. *J. Educl. Res.,* 1971, 64, 303-306.

Raman, V. K. An investigation of the relationship between fertility of imagination and school achievement of pupils in some middle schools. Unpublished masters thesis. University of Mardras, 1959.

Rangarao, B. V. Scientific research in India: Analysis of publications. *J. Scientific and Industrial Res.*, 1967, 26, 166-176.

Raychaudhuri, M. Creativity and personality. Unpublished doctoral dissertation, University of Calcutta, 1962.

Raychaudhuri, M. Studies in artistic creativity. *Rorschachiana Japonica*, 1963a, 6, 17-29.

Raychaudhuri, M. Some perceptual characteristics of incipinet artists, *Ind. J. Psychol.*, 1963b, 38, 13-17.

Raychaudhuri, M. Differential scoialization and musical creativity, *Ind. J. Psychol.*, 1965, 40, 51-59.

Raychaudhuri, M. Perceptual preference pattern and creativity. *Ind. J. App. Psychol.*, 1966a, 3, 67-70.

Raychaudhuri, M. *Studies in Artistics Creativity.* Calcutta: Rabindra Bharati, 1966b.

Raychaudhuri, M. and Ganguly, D. Some social and environmental variables in creativity. *Proceedings of 51st Indian Science Congress,* Part III (Abstract), 1964.

Sathe, K. Experimental study of imagination2 in young children. Unpublished masters thesis. University of Saugar, 1960.

Sharma, M. N. Fluency in relation to intelligence. Unpublished masters thesis. University of Mysore, 1964.

Shyamala, V. Reasoning and problem solving: development of productive thinking in children. Unpublished doctoral dissertation. Banaras Hindu University, 1961.

Singh, S. P. Creative abilities: A cross-cultural study. *J. Soc. Psychol.*, 1970, 81, 125-126.

Smith, P. (Ed.), *Creativity.* New York: Hastings House, 1959.

Strauss, J. H., and Strauss, M.A. Family roles and sex differences in creativity of children in Bombay and Minneapolis. *J. Marriage & Family Life,* 1968, 30, 46-53.

Suwania, M. Creativity among science and arts students. Unpublished masters thesis. University of Udaipur, 1969.

Taylor, C. W. *Widening Horizons in Creativity.* New York: Wiley, 1964.

Taylor, C. W. *Creativity: Progress and Potential.* New York: McGraw Hill, 1964.

Toynbee, A. Is America neglecting her creative minority? In Taylor, C. W. (Ed.), *Widening Horizono in Creativity.* New York: John Wiley, 1964.

Treffinger, D. J., Renzulli, J. S., and Feldhusen, J. F. Problems in the

assessment of creative thinking. *The Journal of Creative Be*
vior, 1971, 5, 104-112.

Yamamoto, K. Creativity—A blind man's report on the elephant. *Counselling Psychol.,* 1965, 12, 428-434.

Williams, F. E. Information awareness checklist. St. Paul, Minneso
Macalester College, 1966.

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School Organizational Climate : An Overview

M. L. Sharma

The author surveys the significant researches done in this area so far, and on the basis of their findings discusses the concept of organizational climate, its measurement and its relationship with other variables.

One of the most significant developments in the study of administration in recent years has been the apparent shift of focus from the theory of administration to organization theory. This newer approach involves first a study of the whole organization, and then the application of this knowledge in a purpose-oriented context. As such it is a mere change in the strategy of inquiry. Thus, what began as the somewhat vague ‘interdisciplinary approach to administration, appears to be converging into a social science of organizationl behaviour in its own right, drawing upon the traditions of the existing social sciences. Human behaviour in organizations has always been a phenomenon of interest and concern. However, it has only been in recent years that organizational behaviour has emerged as a field of systematic study. The major characteristic of this field has been the concerted effort by social scientists to develop a body of reliable and generalizable knowledge about the behaviour of individuals in organizations. The major reason for this development stems from the strong influence of the systems theory model (Scott, 1963) upon current approaches to the study of organizations.

Forehand and Gilmer (1969) conclude that behaviour is determined and after restating the widely held premise that behaviour is a function of the interaction between personal characteristics and environmental variables, go on to define 'climate' as a set of organizational properties which may influence the behaviour of individuals in organizations. At the same time, much of the literature dealing with morale, satisfaction, and related concepts is based upon the assumption that the social climate of an organization is in some way related to motivation, aspiration and eventually, job proficiency. As such, when an individual visits a number of schools he can note quickly how schools differ from each other in their 'feel'. He may find that in one school the teachers and the principal are zestful and exude confidence in what they are doing whereas in the other, the brooding discontent of teachers is palpable and the principal tries to hide his incompetence and his lack of sense of direction behind the cloak of authority. And the psychological sickness of such a faculty spills over to the students, who, in their own frustration, feed back to the teachers a mood of despair. Thus, when one moves from school to school, one finds that each appears to have its own 'personality'. It is this 'personality' that we describe here as the 'organizational climate' of the school. Analogously, 'personality' is to the individual what 'organizational climate' is to the organization (Halpin and Croft, 1966).

Organizational climate refers to the cathectic patterns giving identity to sub-group and interpersonal relations in a living organization (Brown, 1965). A cathecsis can be defined as the degree of affective significance that one object (thing, idea or, as in the present instance, person) bears on another. Organizational catherus will attract, repel, or isolate the sub-groups and individuals along a variety of lines. Some organizational catherus show up along personal lines)categories of intimacy and consideration (Halpin and Croft, 1963). Some are along hierarchical lines (Production Emphasis, Thrust). The peculiar patterning of catherus in any given organization is what we mean by climate.

According to Barnes (1960) closedness and openness in external systems reflect themselves differently in the internal system of a group in terms of member job autonomy (activities), interaction opportunities (interactions), and upward influences (sentiments). In the relatively closed system, external concepts of bureaucratic administration dominate. These serve to discourage subordinate autonomy, infractions, and upward influences. In the more open system, external system values and goals tend to emphasize technical expertise, quality, and developmental work. These serve to encourage subordinate autonomy, interactions, and upward influence.

Feldvebel (1964) while defining organizational climate investigated two possibilities: (1) that organizational climate was a function of the socio-economic status of the school community that the school serves, and (2) that the output of the school, as measured by standard achievement tests, was a function of the organizational climate as well as the socio-economic status of the school community.

Here organizational climate may be defined as patterns of social interaction that characterize an organization. The main units of interaction in this concept of climates are individuals, the group as a group, and the leader. Halpin and Croft, in their (1963) research into organizational climate, deal with both dimensions on the Getzel theory. In fact, an open climate is defined as one in which there is attention to both task achievement and social needs. The closed climate is defined as one which marks a situation in which the group members obtain little satisfaction in respect to either task achievement or social needs. In short, it is a situation where the leader is ineffective in directing the activities of the staff and at the same time he is not inclined to look out for their welfare (Halpin and Croft 1963).

In terms of organizational climate, Halpin and Croft have identified six climates, from 'open' at one end of a continuum to 'closed' at the other. They found that a school possessing an open climate which they deemed as most effective was a lively organization, moving towards its goals while at the same time providing satisfaction to the members of the organization. An important aspect in the effective leadership of an organization is the perception of the leader held by the group with which he is working, as well as the perceptions of the group which the leader holds.

Gust's (1962) research supports the thesis that the educational administrator who wishes to provide for productive change needs to promote the open climate. Gust's study of successful change in an industrial organization basically chronicled the change from a closed to an open organizational climate.

Sharma (1968) also supports the above findings. He found that the schools having 'open' and 'autonomous' climates had a significantly high achievement index as compared with 'closed' climate schools. One of the guiding assumptions of Halpin and Croft's work as well as Sharma's study is that an organizational climate which will be most effective will be one in which it is possible for acts of leadership to emerge easily from whatever source. One essential determinant of schools' effectiveness noted by Halpin and Croft was the ascribed leader's ability, or lack of ability, to create a climate in which he and the other group members could initiate and consummate acts of leadership. If the leader fails to provide sufficient leadership acts —and leadership acts of sufficient 'quality' in that they are 'accepted' and that they also lead in increased group 'effectiveness' then members of the group will seek to offer 'leadership' required to make the group both 'effective' and 'efficient'.

Measurement of Organizational Climate and Its Relationship to Other Variables

Attempts to operationalize the concept of 'organizational climate' in studies of organizational behaviour provide a number of methods for observing climate variables, which include field studies, assessments of participants, perceptions, observations of objective indices, and experimental control of organizational variables.

Theoretical conceptions of the relationship of organizational properties to individual behaviour often emphasize the role of perception of organizational properties as intervening variables. For example, Likert's interaction-influence model assigns central importance to organizational characteristics as they are perceived by the individual. The causal variables (structure, objectives, supervisory practices, etc.) interact with personality to produce perceptions, and it is only through perceptions that the relationship between causal and end-result variables may be understood (Likert, 1961). This point of view suggests the measurement of climate directly *via* the perception of the individuals whose behaviour is being studied. Another argument for assessing organizational climate by means of participants' perceptions is that such perceptions are based upon experience that is both more extensive and more involved than that of an outside observer. As such, Halpin and Croft (1963) in developing OCDQ and Pace (1962) and Pace and Stern (1958), in developing CCI based their research on perception by individuals. Other investigators have developed perceptually based measures of specific hypotheses. For example, Forehand and Guetzkow (1962) and Forehand (1963) obtained a measure of executives' perceptions of the relative 'rule centredness' and 'group centredness' of their organizations by having subjects report solutions to administrative problems that they thought would be most typically adopted in their organizations.

It was in 1954, that the idea of a study of 'organizational climate of schools' was discussed at a CPEA meeting. Lewin (1947) and Rokeach (1960) also discussed the idea of openness and closedness in their work. But the first pioneer study in the field was conducted by Halpin and Croft (1963). They could develop a research tool (OCDQ) which can be of help in determining the organizational climate of schools as well as of other agencies. This tool contains 64 items which have been assigned to eight sub-tests (Disengagement, Hindrance, Esprit, Intimacy, Aloofness, Production emphasis, Thrust, Consideration). In order to discriminate organizational climate, investigators factor-analysed the profiles of the schools, constructed with the help of the scores on the aforesaid eight sub-tests and they found six organizational climates (Open, Autonomous, Controlled, Familiar, Paternal, Closed). This pioneer work in the field of organizational climate was subsequently followed by many other projects and researches conducted by researchers in different countries.

McFadden (1966) reported that the prototypic profiles reported by Halpin and Croft (1963) for their sample were not found frequently among the schools of this study. Thus the results of this study raised serious questions as to the validity of the OCDQ but indicated that the instrument merits further study and consideration. Pritchard (1966) conducted a validity study. The perceptions (ratings) of non-faculty school personnel (NFSP), classified and certificated, connected with the 30 schools in the study sample in any capacity were utilised as an outside criterion in studying concurrent validity of the OCDQ. The NFSP ratings correlated .25 on the average with teacher and principal ratings of the eight OCDQ dimensions. Certain inconsistencies and questionable points of validity were identified. Equating the climate of a school with the climate from which it deviates least in terms of summed absolute difference between sub-test scores, seems to account for the inconsistency in climate assignment. Thus the Halpin and Croft method of classifying schools based on the similarity of the school profile to one of six prototype profiles, according to this study, has questionable validity if the climate descriptions represent valid descriptions of charcteristics of teacher-principal interactons.

Smith (1967) conducted a study to answer the question as to what relationship, if any, exists between the OCDQ developed by Halpin and Croft and external characteristics of schools. As a result of the study the researcher found that the concept of organizational climate as identified by the OCDQ was found to be empirically sound and viable. This study led the investigator to conclude that the OCDQ was externally consistent as well as internally so, which adds further support to the OCDQ as an instrument useful in identifying organizational climates and may be considered empirical evidence supporting the conceptual and theoretical structure of the OCDQ. A study by Andrews (1965) related to validity of OCDQ comprised some sub-studies. As a result of these studies the investigator concluded that the OCDQ is as valid for other kinds of schools as it is for elementary schools. The OCDQ in its relationships with the characteristics of school staffs, demonstrated a large number of relationships which were consistent with theory, some which were equivocal, and none which were inescapably inconsistent. Furthermore, Andrews concluded that the sub-tests of the organizational climate description questionnaire provide reasonably valid measures of important aspects of the school principal's leadership, in the perspective of interaction with his staff.

Plaxton (1965) found a stronger relationship (.61) between teacher satisfaction and climate (assuring order from open to closed), and an even stronger relationship (.68) between teacher satisfaction and espirt were found. Seven of sub-test scores (Trust, Esprit, Intimacy, Production Emphasis, Disengagement, Consideration and Hindrance) were related significantly and in a predictable fashion to principal effectiveness. Teachers' ratings of schools effectiveness were correlated most highly with Esprit (.59) and climate (Spearman Range Co-efficient .61). Another important finding of this study was that Disengagement was also strongly associated with this variable, the relationship being significantly negative (–.42). On the basis of his research the investigator concluded that the sub-tests of the organizational climate descriptive questionnaire provide reasonably valid measures of important aspects of the school principal's leadership, in the perspective of interaction with his staff. Sargent's (1967) research also supports these findings. He found that the teachers of schools having an open climate rated high on teacher satisfaction as well as school effectiveness as compared to those schools with a closed climate. He found that there is a significant rank-order correlation between school openness and teacher agreement on the extent of this openness. There was no significant relationship between faculty size and school climate.

In order to find out relationship of organizational climate to other variables some researches have been conducted. Bushlinger (1966) found that, as the organizational climate of a school increased in proximity to the closed climate the drop-out rate increased. Average staff age, experience and size decreased as the organizational climate of a school increased in proximity to the open climate. Creaser (1966) found school size was related to organizational climate—the larger the school the less open it tended to be. This supports Bushlinger's work (1966) but it is quite reverse to Sargent's (1966) findings.

Thomas and Fink (1963) reviewed 31 studies of effects of group size. They point out that size may be considered "prototypic and really but a correlate of the social and psychological conditions capable of producing changes in member and group behaviour, and suggest as intervening variables, resource input (e.g., skills, knowledge), demand inputs (e.g., members' need for recognition, social interaction), and potential relation complexity. Similarly, studies in applied settings (e.g., Baumgartel and Sohol, 1959; Talacchi, 1960;

Thomas, 1959) suggest that satisfaction of work-group members decrease as the size of the work-group increases. As the number of possible person-to-person interactions increase, the capacity of individuals to form relationships becomes exhausted. A result is the development of small face-to-face sub-groups within the large organization, and of pressures toward cohesiveness and adoption of subgroup norms, some times at the expense of larger organizational goals (Blau and Scott, 1962; Golembiewski, 1962b; Thomas and Fink, 1963).

Some researches were conducted to find out the relationship between the teacher's and principal's perceptions and expectations about organizational climate. Boison (1966) on the basis of his study reported that there was greater divergence than congruence between teacher's and principal's perceptions and expectations for climate. The principals perceived the climates as more open in their schools than the teachers perceived. Teachers expectations for organizational climate were at variance with their own perceptions while principal's expectations and perceptions were related. Murphy (1966) found significant differences between the personality factor means of teachers and teachers and principals who perceived different types of organizational climate. This indicates that the personality patterns of the perceiver may contribute to his perception of a school's organizational climate. It also indicates that the predictive importance of the personality factors vary from one climate to another.

Feldvebel (1964) conducted a study which focusses upon the organization's efficiency as measured by the ratio between selected inputs and the organization's output. Academic achievement was used as the criterion of effectiveness. He found that when the effects of social class are controlled, Production Emphasis (–.40) and Consideration (.39) seem to be significantly associated with achievement. Febel (1966) found that student teachers in an 'open-climate' school perceive the efficiency of the student teaching situation more favourably than student teachers in a 'closed-climate' school.

Sharma's (1968) study also supports these findings. The investigator found that schools having 'open' and 'autonoumous' climate had a singificantly high achievement index as compared with closed-climate schools. Coefficients of correlation between school achievement index and Disengagement (–.67); Hindrance (–.33), Esprit

(+.59); Consideration (+.44). '*r*'-values in case of Disengagement, Esprit, Aloofness, Thrust, and Consideration found to be significant at .01 level but in the case of Hindrance at .05 level. The nature of the coefficients of correlation shows that Esprit, Thrust and Consideration add to the high achievement index of the school while Disengagement, Hindrance, Aloofness affect school achievement adversely. Likert (1961) has summarized evidence which supports the hypotheses that an organization in which personnel policies are participative, democratic instructured, will differ from one whose practices are non-participative, authoritarian, or structured, in that productivity and employee satisfaction will be higher. There is other evidence that the hypothesis may be true for satisfaction but not for productivity (Blau and Scott, 1962; Morse and Reimer, 1956) and that it may be true for some jobs or some parts of an organization, but not for others (Leavitt, 1962b).

But anyhow, all the research is concentrated on discovering rather than creating climate, although some investigators have envisioned the eventual possibility of selecting climates for maximum benefit. Why? The simple and very straight answer is that organizational climate is multidimensional in nature and that it is characteristic of an existing organization, built upon factors beyond the investigator's control. As such, discovery of 'climate' is in the investigator's reach, and as a research device the idea of identifying relevant discussions of climate and varying them systematically has appeal. This permits a clear-cut test of interaction hypothesis, which is the other advantage.

Secondly, as these studies indicate and as social scientists have observed school systems are very complex structures operating under a variety of organizational schemes and having different directional thrusts. If the social or organizational climates resulting from this kind of structuring are related to the motivational level within the organization, and consequently to the achievement level of students in the system, then this is certainly an area which deserves investigation. At the same time, the establishment of an appropriate climate also becomes one of the functions of administration. Empirical data about the possible climate alternatives and the kinds of climate that are valued are needed to give direction to administration, so that the administration may establish appropriate climate in their schools to ensure good teaching learning. But uptil now this domain has not been mapped as far as Indian schools are concerned. So it requires research to be conducted.

REFERENCES

Alan Brown. Two strategies for changing climate. *The CSA Bull.*, July '1965, 64-80

Alexandre M. Feldvebel. Organizational climate, social class, educational output. *Administrator's Notebook*, XII, 8, April 1961.

Baumgartel, H. and Sohol, R. Background and organizational factors in absenteeism. *Personnel Psychol.*, 1959, 12, 431-43.

Barnes, L. B. *Organizational Systems and Engineering Groups.* Boston: Harward University Graduate School of Business Administration, 1960.

Blau, P. M. and Scott, W. R. *Formal Organizations.* San Francisco: Calif.: Chandler, 1962.

Boison, A. G. Relationships among the perceptions and expectations held by principals and teachers for the organizational climate of elementary schools. Unpublished, doctoral dissertation, University of Maryland, *Dissertation Abstracts*, 1966, 27, 2763 A.

Bushlinger, J. S. Organizational climate and its relationship to school dropouts. Unpublished doctoral dissertation, Rutgers, the State University, *Dissertation Abstracts*, 1966, 27, 1575 A.

Creaser, M. C. Parent-teacher contacts as related to school size, number of bussed pupils, and organizational climate. Unpublished doctoral dissertation, Wayne State University, *Dissertation Abstracts*, 1966, 27, 2309 A.

Currier Sargent. An analysis of principal and staff perceptions of high school organizational climate. Unpublished doctoral dissertation, University of Minnesota, *Dissertation Abstracts*, 1967, 27, 2344 A.

David Coles Smith. Relationship between external variables and the organizational climate description questionnaire. Unpublished doctoral dissertation, Northwestern University, *Dissertation Abstracts*, 1967, 27, 2041 A.

Edward Clayton McFadden. The non-participant observer and organizational climate. Unpublished doctoral dissertation, Stanford University, *Dissertation Abstracts*, 1966, 27, 78 A.

Forehand, G. A. Assessments of innovative behaviour—partial criteria for the assessment of executive performance. *J. App. Psychol.*, 1963, 47, 206-13.

Forehand, Garlie A. and Gilmer, Von Haller, B. Environmental variation in studies of organizational behaviour. *Psychol. Bull.*, 62, 6, December 1964, 361-82.

Forehand, G. A. and Guetzkow, H. Characteristics related to innovative administrative behaviour in varying organizational climates. *Education for Innovative Behaviour in Executives* (Final Report, Cooperative Research Project No. 975), Washington D.C.: United States Office of Education, 1962.

Golembiewski, R. T. The Small Group: *An Analysis of Research Concepts and Operations.* Chicago: University of Chicago Press, 1962 (b).

Guest, Robert H. Organizational Change: the Effect of Successful Leadership (Homeward, Illinois: Dossey Press, Inc. and Richard D. Irwin Inc., 1962.

Halpin, A. W. and Crofts, Don B. *The Organizational Climate of Schools.* Chicago: Midwest Administration Centre, University of Chicago, 1963.

Halpin, A.W. and Croft. Organizational climate of schools. In Halpin, A. W. *Theory and Research in Administration.* New York: Macmillan, 1966.

Jhon, H. M. Andrews. What school climate conditions are desirable. *The CSA Bull.*, July 1965, B, 4, 4-20.

Kurt Lewin's classic article in *Human Relations*, initial Publication in 1947, has been reworked in more modern terms by Lippit, Downey, Cunningham, and possibly others.

Likert, R. *New Patterns of Management.* New York: McGraw-Hill, 1961, 196.

Leavitt. H. J. Unhuman organization. *Harward Business Rev.*, 1962, 40, 90-98 (b).

Milton Rokeach. *The Open and Closed Mind.* New York: Basic Books, Inc., 1960.

Morse, Nancy and Reimer, E. The experimental change of a major organization variable. *J. Abnorm. & Soc. Psychol.*, 1956, 52, 120-29.

Murphy, J. A. Jr. An investigaiton into certain personality factors of elementary school teachers and principals with reference to the organizational climate of the school. Unpublished doctoral dissertation, University of Georgia, *Dissertation Abstracts*, 1966, 27, 3670 A.

Pace, C. R. Implications of differences in Campus atmosphere for evaluation and planning of college programs. In R. L. Sutherland, W. H. Holtzman, E. A. Kaile, and B. K. Smith (Eds.). *Personality Factors on the College Campus*, Austin, Tex: Hogg Foundation for Mental Health, 1962.

Pace, C. R. and Stern, G. C. An approach to the measurement of psychological characteristics of college environments. *J. Edul. Psychol.*, 1958, 49, 269-77.

Plaxton, R. Principal personality and school organizational climate. *The CSA Bull.*, July 1965, 4, 21-35.

Scott, William G. Organizational theory: an overview and an appraisal. In Litter, Joseph A. (Ed.). *Organizations, Structure and Behaviour.* New York: Wiley, 1963, 13-26.

Sharma, M. L. A comparative study of the organizational climate of the government and private secondary schools of Churu district (Rajasthan). Unpublished NIE Associateship dissertation. National Institute of Education, NCERT, New Delhi, 1968.

Talacchi, S. Organizational size, individual attitudes and behaviour: an empirical study. *Administrative Science Quarterly,* 1960, 5, B, 98-420.

Thomas, E. J. and Finr, C. F. Effects of group size. *Psychol. Bull.*, 1963, 60, 371-84.

Thomas, E.J. Role conceptions and organizational size. *Amer. Soc. Rev.*, 1959, 24, 30-37.

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Psychodiagnostic Applications of The Mirror-Tracing Test

D. N. Tutoo

The author recounts the history of the Mirror-tracing Test and discusses the researches on it in an attempt to assess the potentialities of the test in diverse fields and to arrive at an objective assessment of the assets and liabilities of the test in psychological and educational research.

The Mirror-tracing Test is about to complete nine decades of its existence in psychology. Ninety years is a big span of life for any psychological tool to show its worthwhileness as a multivariate tool. There appears to be no other tool which has been introduced in the field of psychology with so little fanfare as the Mirror-tracing Test. Introduced by Buckwald (1948). of Berlin in 1878, the test has lived a long period of existence, and, since its introduction, has suffered from the vicissitudes of fortune from time to time. Its popularity has varied from university to university and from one psychological laboratory to another. Beginning its role as a tool for studying the relationship between visual perception and motor movements, the mirror-drawing technique has entrenched itself variedly in different universities and psychological laboratories of the East and the West, and has been employed in studying various problems, beginning from learning and extending to the study of problems on trial and error, transfer of training, delinquency, pilot selection and psychodiagnosis and psychotherapy. There is also an interesting application of the test in the field of clinical psychology as demonstrated by a research study by Tutoo (1968). Since the researches on the Mirror-tracing Test are numerous, it is worthwhile to assess the potentialities of the test in diverse fields so as to arrive at an objective assessment on the assets and liabilities of the test in psychological and educational research.

In the initial stages of work, the Mirror-tracing Test was employed by research workers as an experimental tool in analysing and observing the nature of the learning process and in studying the relationship between visual perception and motor learning. Henri (1948) and Dearborn (1910) employed the test in studying the mechanism of learning in a human situation. They found that there was alteration of established customary visual-motor behaviour among experimental subjects because of the mirror which rendered performance difficult to execute. The subjects in the experiment were required to master the task of tracing by re-establishing the customary coordination in their visuo-perceptual movements in their successive trials on the Mirror-tracing Test.

In the wake of the first publication of the results on the Mirror-tracing Test, there followed a series of other publications emanating from experiments conducted in various psychological laboratories of the world in both the East and the West. Though all the results on the Test did not find their way to journals, a large number of studies were mainly devoted to the learning process among subjects. Clinton (1930) explored the nature of the mirror-drawing ability by studying the norms on mirror-drawing for white and Negro children by age and sex. In his investigation, the investigator obtained data on 1903 unselected students in four school systems, who were allowed to work for a period of five minutes on the mirror-drawing pattern sheet. On the basis of trials, the investigator found that mirror-drawing was essentially a trial-and-error motor learning process, that mirror-drawing performance developed from year to year, that there was a positive relationship between mirror-drawing ability and general intelligence, and that there was a positive relationship between mirror-drawing ability and simple motor speed-marking and making letters. Studies published by other investigators supported some of the finding of Clinton (1936), and Yoakum and Calfee (1913), who had found that the subjects, on the basis of performance on the Mirror-tracing Test, could be classified into fast, slow and irregular groups. Extending this aspect of research further Cook (1914) employed the test in studying the prospects of positive and negative transfer in learning among subjects from time to time. He gave 100 trials to subjects, involving various parts of the body such as the left and right hands and left and right feet, which were tested for transfer. His results indicated that there was some transfer to all muscle groups and that transfer was the greatest to the symmetrical muscle group on the opposite side of the body and least to the muscle group opposite to the unsymmetrical parts of the body. Similar types of studies followed. Valentine (1954) considered mirror-drawing as a crude and primitive method of learning in which movements were learnt and remembered through kinesthetics cues. Burt (1938) had also employed the test for examining the motor-habit formation in children. In his studies, Burt found that the skill acquired with the right hand was transferred to a considerable extent to the left hand among normal children but not among the dull children. Collins and Drever (1956) employed the test in studying the mechanism of coordination of movements between the hand and the eye during trial-and-error learning. They had drawn a curve of learning based on the time taken for the respective tracings. Postman and Egan (1958) also utlized the Mirror-tracing Test for studying cross-education and bilateral transfer. The authors, through their experiments, had found that most of the subjects start at a low level of skill but improve considerably after practice. They found that transfer effects were the result of the 'method' of attack and 'attitudes' which were transferred from one situation to another. Kuppuswamy (1947) and Scheldemann (1948), through various experiments, found that the new coordination among subjects between their motor and perceptual processes was a result of trial-and-error learning and not imitation or ideational control. Scheldemann's experiment had yielded learning curves which bore similarity to Starch's one hundred records and were typical of all learning curves. Scheldemann had found that the effect of practice of the right hand upon the left hand was quite considerable.

Other investigators employed the Mirror-tracing Test as a tool for studying the problems of habit formation. Notable studies of this type were undertaken by Dashiell (1948), Grings (1952), Stevens

Stevens (1951) and Woodworth (1947). These investigators studied the characteristics of the learning curves by studying time and error scores of subjects. They also studied qualitative changes in the performance of subjects by examining the turns and curvatures of the learning curves.

The contribution of the Mirror-tracing Test in helping to understand the learning process is manifold. Experiments carried out with the help of this test have helped in understanding the types of changes brought about by the practice in learning curves. Notable investigations in this direction are those of Woodworth. In part, his studies had examined the extent of transfer that was maximally possible from one hand to another and from one foot to another. But his later experiments with the test showed that other factors like nervousness and self-consciousness also affected performance of subjects irrespective of their age at the time of testing.

In an educational situation, the mechanism of "acquisitive" process in learning is important to know. It is, therefore, imperative to understand the psychology of this process. The Mirror-tracing Test has helped considerably in unravelling this process. The findings from mirror-drawing studies have shown that the role of cognition in a behaviour like learning is not mechanical but pervasive. Relevant studies, throwing light on this aspect of learning, are those of Trow (1950), Bugelski (1950), Guilford (1947), Gagne (1952), Sartin (1958) and Shaffer (1956). These mirror-drawing studies have not only explained the principle of trial-and-error learning scientifically but have enlarged the concept of learning process from the mere "substitution" proccess to a dynamic one. Thus, these experiments have shed considerable light on trial-and-error learning. They have also simplified the principple underlying "positive", "negative" and "zero" transfer that occurs in various learning situations.

Perceiving the fact that the Mirror-tracing Test had the genius to explain the learning process in detail and depth, many alterations were made in its constructions to study other problems pertaining to learning behaviour. Important studies in this direction are those of Whipple (1948), Calfee (1913), Wells (1918), Pyle (1923), Ewerts (1926), Starch (1948), Lachman Witty (1948), Higginson (1938), Weber (1938), Cook (1941), Lasterback (1927), Suoddy (1948) and others. The important observation emerging from the aforesaid studies is that the Mirror-tracing Test has diverse uses in a laboratory.

However, modification in the design of the test was not only necessitated by the difficulty faced in counting errors but also in motivating subjects to respond favourably towards the test. The structural changes in the design were as diverse as there were innovators. Dearborn came out with a single line star whereas Whipple devised a concentric double-lined figure (Star) which has, in fact, remained a standard figure since then. However, due to limitations, which the star pattern has posed—that the learning process could be memorized and might therefore facilitate learning without complete mastery of the visuo-motor relationship—Calfee and Yoakum devised a circular design about 16 centimetres in diameter, around which were marked 12 equally spaced points. The centre of the circle was marked with '0' and its circumference was labelled with figures from 1 to 12 in random order to avoid memorization. The advantage caimed in this design was that it eliminated practically all automatic behaviour and demanded attention and ingenuity on the part of the subject.

Since these innovations in the design changed the character of experiments on the Mirror-tracing Test from time to time, many new explanations were advanced by various investigators regarding the learning process. The purpose behind each change was to understand the trial-and-error phenomenon if learning on a more scientific basis. The intention while changing the design was not only to render a systematic account of errors but also to remove the possibility of learning by mechanical means alone. Keeping these prerequisites in view. Well (1918) introduced another change by employing electric devices for counting errors. In his apparatus, electric connections were tied to a metallic star which was connected to a counter and also to a power source. A metallic stylus connected to electric connections, completed the circuit. This arrangement enabled the experimentor to count errors easily for each trial separately.

In the wake of changes in the design of the test, experiment carried out with the help of the Mirror-tracing Test, exposed many interesting changes in the learner's behaviour. However, each modification in design was introduced with a specific purpose in view. Pyle (1923), for example, employed concentric circles, fortified by electric connections with numerical numbers from 1-24 placed around the circumference of two circles. With a view to make the learning process mere complicated subjects were asked to place a dot on each number and thus to draw a continuous line cutting these dots again in numerical order. This device helped in reducing the scope of memorization in a subject at the time of working on the test.

Since each change in the design of the test was accompanied by a spate of new findings on the mechanism of learning, many more changes were registered in the test. The main motivation behind each change was to study the learning process in detail and depth. It would therefore be pertinent to briefly describe the other changes that were brought about in the designs of the test, besides those already mentioned above.

Lachman and Witty brought a change of an altogether different type in the Mirror-tracing Test. He contrived the design out of three leaf-metal frames. The top leaf covered the window and was held in place by a wire hinge. The middle-leaf was of polished metal which operated as the mirror. The slug accross the bottom of the leaf was made to rest against the third leaf which formed the base and the platform for the entire pattern. All the three leaves were collapsible so as to form a compact unit for storing. Another modification of importance was that made by Starch (1948). He used simple hooks to support the mirror in place and used a cardboard screen which was clamped to a tripod. This arrangement had the claim of simplicity and economy over the equipment illustrated by Pyle. Another change introduced by Higginson (1938) in the design was motivated by the idea of introducing illumination which was found helpful in eliminating shadows which had affected the performance in earlier studies.

However, a significant change in the test was introduced by Weber (1939). He replaced the simple mirror by convex and concave, and later by parabolic mirrors. These mirrors created many distortions in the object. Such distortions made the mirror-drawing performance even more difficult for all subjects to perform.

Despite these changes in the design of the test, the test continued to remain simple and economical and enjoyed immense popularity due to its simplicity and versitility. Because of these advantages in the test, many investigators were eager to do more studies with the help of the Mirror-tracing Test. These investigations belonged not only to the realm of learning but also to other areas of the educational process. It would be profitable to dilate on these mirror-drawing experiments as they would help in throwing light on their mechanisms of the learning process in detail.

Holsopple (1932) found that in a classroom where different types of subjects are studied the teaching process had to be differential and unique. The investigator based his conclusions on the fact that emotionally disturbed pupils were unable to control or inhibit their habituated responses. He concluded that mirror-drawing could serve as a helpful tool to counsellors for diagnosing important behaviour characterstics in the case of emotionally disturbed pupil. His experiments on the learning behaviour of emotionally disturbed pupils had also shown that their performance was slow and their lines were very light or very heavy. Their digressions from the correct path were numerous and wide. They were unable to control their movements which moved in many pointless ways. They even laughed and sighed. In the case of emotionally adjusted pupils, the drawings were drawn early and quickly and were characterised by uniformity, energy and by persistent performance. Similar prognostic experiments were conducted on other types of pupils belonging to various clinical groups and diverse socio-economic levels.

To verify the findings of Holsopple's experiments, Weidensall used the mirror-drawing technique in studying the learning behaviour of normal pupils and compared it with that of the pupils who were studying in various classes lodged in different reformatories and in schools functioning in villages. He confirmed Holsopple's observation that emotionally disturbed pupils were incapable of sustained effort stress. The findings bore an important bearing on the teaching practices followed in the classroom. The educational implications of these studies are that since pupils in a class come from diverse background their progress in learning is not only to be reviewd from the intellectual angle but also from the emotional angle ,as is evident from the aforsesaid studies. Laiprade (1948) also suggested a specialised curriculum for children who are not too well emotionally. He suggested separate classes and a separate set of instructions for various groups of pupils. He found that children suffering from various emotional problems tend to invert their writing when using a mirror. Vogt, (1948) also advocated a separate curriculum and special teaching methods for children with definite emotional problems. Bois (1948) and Ball (1928) were also able to use the mirror-drawing technique for differentiating the more stable pupils in the classroom from unstable pupils.

Cook, while investigating the studies in cross-education, used the Mirror-tracing Test as the instrument of study. After 100 trials of practice with their right hand in mirror-drawing and using a star-shaped maze as the tracing object, the left foot, the right and the left hand were tested for transfer. Similarly, after 100 practice trials with the left foot and the right hand, the left hand and the right foot were tested. The author reported that:

1. There was some transfer to all muscle groups.
2. The transfer was greatest to the symmetrical muscle group on the opposite side of the body, next to the muscle group on the same side and least to the muscle group which is both unsymmetrical and opposite to the practiced hand or foot. The percentage of transfer varied with the measure used.
3. There was no difference between the amount of transfer from hand to foot and from foot to hand.

Burt, in his investigation, reported a correlation of .67 between speed in mirrordrawing and intelligence as estimated by teachers. Clinton, however, found no correlation between mirror-drawing and the scores made on intelligence tests. Comparing the two results Clinton argued that, after all, the teacher estimated highly the intelligence of that child who quickly and easily inhibited those bits of behaviours that were not approved by the teacher. The results obtained by Burt, obviously, appear to be circumstantial.

The mirror-drawing technique was used by Hartog (1948) for studying anxiety provoked during examination in students. He called this technique as the 'Kotaphograph'. In his tentative work, he compared the mirror-drawing performance against the criterion of number of affirmative answers given by pupils on a questionnaire of 25 items pertaining to examination anxiety.

Lastly, Abt and Bellak (1952) employed the Mirror-tracing Test for studying pupil behaviour in the classroom under stress as introduced by teachers. In their various experiments they found that this device was a visuo-motor expressive technique which functioned as a projective device. The investigators found that the following essential factors were partially measured by this device:

1. Speed and accuracy of performance
2. Marked agitation and disorientation
3. Degree of endurance under stress
4. Adaptability to novel situations.

From the studies reviewed above, it is evident that the Mirror-tracing Test has many uses in educational practice. Further research is required to explore the full potentialities of the test in educational and vocational guidance.

BIBLIOGRAPHY

Abt, L.E. and Bellak, L. *Projective Psychology: Projective Tests in Non-clinical Areas,* Part III. New York: Alfred A.K., 1952, 454-458.

Anderson, P.K. A study of the relationship between performance in a mirror-tracing test and extroversion introversion. *The Journal of General Psychology,* 1948, 38, 71.

Ball, R.J. An objective measure of emotional instability. *J. Appl. Psychol.,* 1929, 13. 226-256.

Bois, J.S.A. The mirror-tracing test. *The Journal of General Psychology,* 1948, 38, 69-99.

Brower O. The relation of visio-motor conflict to personality traits and vascular activity. *Journal of General Psychology* 1948, 38, 89-99.

Bugelski, B. *A First Course in Experimental Psychology.* New York: Henry Holt and Co., 1950, 319-320.

Buckwald, J. *The Journal of General Psychology,* 1948, 38, 66-74.

Burt, C. Experimental test of general intelligence. *Br. J. Psychol.,* 1909, 3, 94-177.

Burt, C. *The Backward Child.* New York: Macmllan Co., 1938, 503-509,

Calfee, M. College freshmen and four general intelligence tests. *J. Educl. Psychol.,* 1913, 4, 231-233.

Clinton, R.J. Nature of mirror-drawing ability: norms on mirror-drawing for white children by age and sex. *J. Educl. Psychol.,* 1930, 21, 221-228.

Collin, M. and Drever, J. *A First Laboratory Guide in Psychology.* Third Ed. London: Methuen and Co. Ltd., Experiment 50, 1956, 112-113.

Cook, T.W. Mirror position and negative transfer. *J. Exp. Psychol.* 1941, 29, 150-160.

Cook, T.W. Studies in cross education. *J. Exp. Psychol.,* 1933, 16, 144-150.

Dashiell, J.E. *An Experimental Manual in Psychology: Habit Formation in Mirror drawing.* Boston: Houghton Mifflin Co., 1948, 75-76.

Dearborn, W.F. Experiments in learning. *J. Educl. Psychol.,* 1910, I, 374-388.

Everts, P.H. Bilaternal transfer in mirror-drawing, *J. Genetic Psychol.,* 1926, 33, 235-249.

Gague, M. and Fleishman, E.A. *Psychology and Human Performance.* New York: Holt, Rineband & Winston, 1952, 257-259.

Grings, W.W. *Laboratory Instrumentation in Psychology.* Palo Alto, California: The National Press, Chapter 7, 1952, X, 197-202.

Guilford, J.P. New York, McGraw Hill Company, Inc., Chapters I & V.

Guilford, J.P. *General Psychology.* New York: D. Van Nostrand Co., Inc., 1947, 17, 382-383.

Hartog, E.J *General Psychol.* 1948, 38, 69-99.

Henri, J. The relationship of visuo-motor conflict to personality tests and cardio-vascular activity. *J. Gen. Psychol.,* 1948, 38, 69-99.

Higginson, B.D. A mirror-drawing apparatus for the instructional laboratory, *J. Psychol.,* 1938, 6, 335-37.

Holsopple, J.Q. The social adjustment of deliquents who are unable to inhibit old automatic perceptual responses. *J. Soc. Psychol,* 1932. 3, 91-96.

Kuppuswami, B. *Elementary Experiments in Psychology.* London: Oxford University Press, 97, 1947.

Laprade, A. The relationship of visio-motor conflict to personality traits and vascular activities. *J. General Psychol.,* 1948, 38, 69-99.

Lasterback, C.E. An improved technique in the mirror drawing device, *J. Exp. Psychol.,* 1927, 10, 114-116.

Lachman and Witty. Reference in *J. General Psychol.,* 1948,38,69-74.

Louttit, C. M. The mirror-tracing test as diagnostic aid for emotional instability. *Psychol, Res.,* 1943, 5.

Postman, L. and Egan, J.P. *Experimental Psychology: An Introduction.* New York: Harper and Brothers, Chap. 18, 1956.

Pyle, W.H. *A Laboratory Manual in Psychology of Learning.* Baltimore: Warwick and York, 1923.

Sartin, A.Q., Strange R.J., North A.J. and Clapman, H.M. *Psychology: Understanding Human Behaviour.* New York: McGraw Hill Book Co., Inc., Chap. 12, 1958, 248-258.

Scheldemann, N.V. *Experiments in General Psychology.* Chicago: The University of Chicago Press, Illinois, 210-222, 1948.

Shaffer, L.F. *The Psychology of Adjustment: An Objective Approach to Mental Hygiene.* Boston: Houghton Mifflin Co., Chap. VLI, 180, 1956.

Snoddy, G.S. Evidence for two opposed processes in mental growth. *J. General Psychol.,* 1948, 38, 72.

Starch, O. A demonstration of the trial and error method of learning. *Psychol. Bull.,* 1948, 7, 20-23.

Stevens, S.S. *Handbook of Experimental Psychology.* New York: John Willey & Sons, Inc., Chap. 17, 624-625, 1951.

Trow, W.C. *Educational Psychology,* Haughton Mifflin Co. Second Ed. Cambridge: The Riverside Press, 1950, Chap. XIII.

Tutoo, D.N. *The Mirror-tracing Test as a Measure of Psychotherapeutic Tool.* Published Ph.D. Monograph, 1968.

Weber, C.C. The study of visio-motor co-ordination with the prabolic morior. *J. General Psychol.,* 1939, 20, 239-242.

Weidnsall, J. Mentality of the criminal women. *J. General Psychol.,* 1948, 38, 70.

Wells, G.R. An apparatus for mirror-drawing test. *J. Educl. Psychol.,* 1918, 99-101.

Witty, K. *J. General Psychol,* 1948, 38, 78-90.

Woodworth, R.S. *Experimental Psychology.* New York: Holt and Henry Co. Chap. 8; 186-187, 1947.

Whipple, S. Reference in *J. General Psychol.,* 38, 1948, 72.

Valentine, L.W. *An Introduction to Experimental Psychology.* London: University Tutorial Press, Chap. XI, 181-192, 1954.

Yoakum, C.S. and Calfee, M. An analysis of the mirror-drawing experiment. *J. Educl. Psychol.,* 1913, 4, 283-292.

Vogt, L. Reference in *J. General Psychol.,* 1948, 38, 69-99.

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Research Note

Factors Determining Occupational Choices of Secondary School Leavers

Jamnalal Bayti, Lecturer, Gandhi College of Education, Gulabpur, Rajasthan, reports a study undertaken by him to find out: (i) the pattern of factors determining the occupational choices of secondary school leavers; (ii) whether there exist sex differences in this pattern of factors; (iii) whether there exist differences in this pattern arising out of the socio-economic-cultural background of the subjects.

The sample comprised 1978, Class X students, age-group 14-18 years, from government and privately managed or aided and recognised secondary schools in Kankroli (Udaipur District) and Sardarshahar (Charu District) in Rajasthan. In this sample there were 1728 boys and 250 girls. The boys had offered either the Humanities Group or the Science Group or the Commerce Group while the girls had all taken up the Home Science Course.

The tool used was a questionnaire containing 43 factors for the selection of a particular occupation, on which the *Ss* had to indicate that factor which had determined their occupational choice.

Findings indicate that the most preferred factors, in the order of preference, were: opportunity for social service, defence of the country, better future prospects, interesting work, possession of the ability to acquire competence in the vocation, full qualification for the job, healthy environment, government service, recommendation by the relatives, fair treatment, a job involving no heavy expenditure in training for it.

The study found no difference in the preferred factors between *Ss* coming from two different cultural settings, with regard to certain foundamental things, though in certain situation the *Ss* preferred differently.

As regards sex differences, the girls preferred the same factor as the boys did, but included some additional factors also as being important.

BOOK REVIEWS

The Stirrings of Educational Change

The Secondary School at Sixes and Sevens : A Review of the Sixties and Prospect of the Seventies

R. T. Fitzgerald. Australian Council for Educational Research, Victoria, 1970. (Pp. ix+234, $ 5.40)

The modern age is an age of experimentation and, as such, no field of human enterprise can remain impervious to changes and innovations which are the inevitable upshots of such experimentation. If in any field of human enterprise the impact of experimentation is most keenly felt, it is the field of education, since it is education which is to truly reflect the new expectations and new aspirations of societies, both developed and developing.

The other consideration that marks the modern age is that education is no longer looked upon as meant for the elitist few, which position is hoped to be maintained from one generation to another. In fact, education has emerged from the cloister to embrace the community. Accordingly, education is now called upon to develop individuals to their highest capability so as to increase the amount of competence in a society. This, therefore, rules out the possibility of the largest proportion of students being declared as unfit and assures the establishment and extension of schooling for all to the very end of secondary education, with an eye to the individual's interests and attitudes and his capacity to profit from it. Furthermore, in the face of fundamental and rapid changes it is not only a question of fitting policies and decisions into the present context, but also a question, and of much more vital importance, of projecting into the future. And it is rightly held by W. C. Radford, Director, Australian Council of Educational Research, in his Foreword that "no institution or type of education is, in 1970, quite what it was in 1960. It is a safe prediction, I believe, that by 1980 the changes will be more dramatic and the rate of charge and adaption even faster than they were in 1970." This inescapably calls for consideration of very many facets of educational change in secondary schools such as teaching, developing curricula, recruiting staff and providing them to schools, the learning process and its outcomes, training teachers, administering school systems, and so on. In the light of the foregoing R. T. Fizgerald's book, *The Secondary School at Sixes and Sevens,* publised by the Australian Councill of Educational Research has come not a day too soon. The book takes up informed discussion on a complex of educational issues affecting the secondary school education in Australia, such as the size and nature of the new student body, financial policy, the teaching staff, school organization and the secondary school programme. The author with his background in the historical, comparative and sociological aspects of change in education has discussed very thoroughly the developments in each aspect supported by empirical data and also their consequential impact on the emerging shape of education in Australia. These issues might be distinctively Australia's own, but the educationists of other countries which are in the throes of far-reaching developments in the schools will find them interesting and helpful.

Chapter I "New Student Body" discusses the changing character of the student body in view of the greater proportions of the nation's fifteen-year-olds and sixteen-year-olds attending school. It has shown student enrolments in Government and Non-Government schools between particular periods, percentages of different age-groups in the total populations still at school and the proportion of school pupils at certain age levels in Government and Non-Government schools. The chapter also discusses the role of student retention in different federal states and the factors responsible for it, which include new legislation raising the school leaving age, variations in school organization and examination systems and the introduction of new courses. The author anticipates, in the decade ahead, further phenomenal changes in the character of the student population in Australia, with far-reaching implications for school administration and organization as well as curricula, public examinations and the whole field of tertiary education.

Chapter 2 "Meeting the Costs" discusses the financial implications for the influx of student enrolments during the past decade. A growing demand for educational services at all levels has entailed a great increase in educational expenditure. The Department of Education, deeply committed to meeting the expenditure on education, feels the imperative need for some form of comprehensive planning both at the federal and state levels. The Commonwealth has undertaken to contribute to the development and operation of colleges of advanced education and to the building of teachers' colleges and secondary school libraries. A number of tables have been given to show the allocation of funds to education by State Governments, by Commonwealth and State authorities, by the Commonwealth itself over the past few years. Besides the phenomenal increase of stu dent population the length of courses and structure of examination systems are the determining factors of the costs of secondary school organization. Coupled with this are the factors which determine the cost of schooling—administration transport and teacher-training. The hightening financial pressure has also come to bear heavily on the independent schools. Catholic school authorities experience also the same difficulties. As the indication is, the Commonwealth will play an important role in shaping educational policy and in providing economic assistance for expansion and improvement of educational facilities. Australia is now in the grip of widespread changes and innovations, i.e., modernising school buildings, introducing intensive and extensive schemes of in-service training and launching curriculum projects which utilize a wide range of talent on a national scale; and adequate funds have to be pressed into service to implement them.

In justice to the great and widespread changes in the nature of the secondary school population and programme and the maintenance of the quality of secondary schooling in Australia, there is the imperative need for better qualified teaching personnel who will be increasingly called upon to meet the challenge of revolutionary developments in the schools and to ensure and sustain the desirable outcomes. The author has discussed this issue very thoroughly in Chapter 3 "Staffing the Schools". The traditional or *ad hoc* teacher pupil ratios have been found to be less and adequate in view of the ability-groupings of students, adoption of new teaching methods and provision of more elaborate facilities. To ensure qualitative improve-

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ment of education requisite qualifications for teachers in the secondary schools pose a stupendous problem. The traditional notion of 'every secondary teacher a university graduate' appears basically unreal in view of the widening diversity in the curriculum. It remains still a matter of much controversy at to what exactly is a worthwhile course in teacher education or what constitutes basic qualifications for teachers. This inescapably calls for reappraisals of the whole context in which the teachers function. It is not only a question of improving staffing in schools quantitatively but also the question, and this is indeed more important, of attracting greater numbers of better qualified and talented teachers to the teaching profession. In this context the author has rightly emphasized the need for creating a congenial climate of work and employment which should satisfy the expectations of the profession. He has discussed in detail the teachers' salaries, their present-day professional status and qualifications, procedures of annual increments, service conditions, the greater frequency of their public protests over issues such as staffing, teacher training and recognition of qualifications, promotion policies and so on. This chapter gives a pen-picture of the working conditions of teachers in Australia. However, much of what has been said about the teachers in respect of their service conditions, qualifications, salaries, dilution of quality, teachers' salaries comparing unfavourably with those earned in other professions with similar qualifications will hold more or less true for other countries also. Here is a comment by the author, which is poignantly realistic and almost universally applicable:

> The kind of salaries paid to teachers is obviously a crucial factor in any significant improvement in the quality of education provided in the schools. Teachers' salary rates and working conditions need therefore to be so geared that the schools secure and retain their required shape of the pool of ability available.

Chapter 4 "School Organization" is a scintillating discussion on secondary education for all in Australia. Education in Australia cannot remain confined to a privileged minority at the cost of very many adolescents who are in need of a general kind of education. The traditional organisation of courses in terms of multilateral form has not been found very satisfactory for lack of flexibility, undue emphasis on purely intellectual activities and failure to consider the latest developments in the field of learning theory. In this connection, the author has discussed the Wyndham scheme which has been introduced in New South Wales to create a new school pattern that allows fully for individual differences among adolescents. The scheme attracted wide attention throughout Australia. The scheme gives the schools a greater degree of independence and flexibility than before. School Principals have been encouraged to experiment with forms of time-tabling that makes for a varying pattern of student ability and interest. Fixed streams or courses under the multilateral idea have been replaced by individual student programmes, as a result of which students more able in the particular field of study can take this subject at an advanced level, while coresponding studies at pass level are available to students less able or less interested in a particular subject. The advantage is that individual student under this flexible programme can tackle both the basic and elective subjects of his particular programme at various standards. This imposes new tasks of preparing multiple syllabuses and examination papers at different levels.

The chapter also discusses the ways of establishing a clear and more effective relationship between the staff and students, the size of the school in the light of the concept of pastoral care and of its potential contribution to the development of students, continued expansion of technical schools offering their own special courses for a wide range of student ability and interest and their future status, entry to secondary school, ability groupings and the question of transition within a general framework of basic 'core' and elective subjects, the changing concept of student image, and new trends in school architecture, reflecting changes in Australian secondary schools and thus conducing to more effective teaching-learning.

Any attempt to reform secondary education, just allowing the examination system to remain entrenched in the stronghold of its tradition, will understandably be a meaningless undertaking. This is as much true of Australia which is very much seized of the problem as of countries which are committed to the qualitative improvement of education.

In Chapter 5 "Secondary School Programme" the author seizes upon the examination system as a very crucial issues and, with it as a focal point, discusses a number of related issues like curriculum development, flexibility of courses, new expectations of teachers, problems of assessment and so on. Public examination results, as elsewhere, continues to serve for the Australian Community as the overriding criterion of secondary school performance. Naturally the set syllabus, student's notebook and daily pattern of questioning remain to a large extent the teacher's tools of trade. Hopefully, recent modifications have, in most of the states, included the replacement of the certificate itself by single subject passes, obviously directed towards lowering the prestige of these examinations. Such changes in the examination system has ineluctably set in train new forces for curriculum reconstruction. A new source of influence at work is the emergence of teachers' subject associations. There is now an increasing awareness amongst teachers of more fundamental issues such as the place of an individual subject in the total school programme and the structuring of a discipline in the ways in which it could be studied more meaningfully. This has also necessitated the development of new techniques and skills in the study of most of the disciplines, which now put more emphasis on the process of inquiry and problem-solving than on just consumption of knowledge. Now, thanks to curriculum innovations, a context more favourable for learning has been created, and the pervading stress on uniform standards of intellectual attainment has gracefully receded into the background, making room for a balanced programme of learning experience for students with a wide range of abilities and interests. In this changed context what is most needed is an enlightened, informed and dedicated teaching force which hopefully is available. Teachers are now more and more concerned with issues and outcomes fundamental to learning. A new vitality and sense of dedication and purpose has gripped the teaching profession, and the adoption of team teaching, the reappraisal of school programmes and practices and structured learning materials are ample evidence of that. This chapter also discusses in detail the components of the secondary school curriculum, in the light of the new trends the world over, with particular reference to the teaching of English, social sciences, science, mathematics, foreign languages and to a diverse and widening range of subjects outside the traditional group of core studies.

Chapter 6 discusses the plea for holding the adolescents at school for a longer period than ever before both for academic reasons and economic return, and this is in fact happening with the lifting of examination barriers, originally designed to limit the progress beyond certain points of all but the deserving few. It is indeed a stupendous problem, and decisions taken on a piece-meal or *ad hoc* basis are no answer to it. Educational reform is a very delicate issue since it concerns the most sensitive segment of humanity, and this underscores the need for comprehensive and continuous planning by specialists conversant with current thinking and developments in education.

The application of such expertise to wide-ranging problems in Australian education will involve major changes in administrative procedures, removal of imbalance of educational opportunities for different regions, freeing schools from the shackles of external examination and its far-reaching implications, development of new approaches to learning, preparation of teachers to measure up to the challenge of radical innovation, continuous curriculum renewal and reconstruction, new perspectives in secondary school education with its emphasis on the outcomes of courses—outcomes related to the acquisition of techniques and skills as well as changes in attitudes. Australia is vibrant with these stirrings, a sequel of the time spirit, with the prospect of far-reaching results in the years ahead.

Mr. Fitzgerald has written very sensitively about secondary school education in Australia. The book as a whole provides a very useful interpretive map of secondary school education and of the shape it is likely to take in the years ahead. It contains much of interest and value not only for the educational historians, educational planners and curriculum designers in Australia but also for the same in other countries which feel the stirrings of change and innovation. Th decade ahead will experience more changes and innovations, perhaps more revolutionary than those of the decade just over. These could not be the last scenes of an educational drama. They are the on going events of a continuing enterprise. Hopefully, Mr. Fitzgerald's book is prognostic of that.

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Pairs in the Group

Interpersonal Relationship

S. Malhotra. United publishers, Allahabad, 1970.
(2nd edn.) (pp xiii+198. Rs. 39.00, $ 7.00, 55 sh).

This book on the interpersonal relationship is an account of research investigation into the sociological and psychological factors in the relationship between mutually attracted adolescent pairs. The specific purposes of the investigation have been mentioned as: (1) to study whether the similarity of socio-economic status, language, culture and living habits, interests, mental ability, extroversion-introversion, sentiments, and psychological needs, brings about mutual attraction between two friends; in other words, to find whether similarity of these sociological and psychological factors occurs in paired friends. (2) To study that the paired friendship is influenced by proximity and physical appearance. (3) To consider the effect of the factors, other than the assumed ones, that might emerge during the investigation.

The need for the study has been emphasised from both the theoretical and practical viewpoints. From the theoretical viewpoint it is states have a cultural value. The social, cultural, economic conditions operating in our country and their influence on interpersonal relations can be made available as a systematic body of knowledge. From the practical viewpoint, the findings can be useful in understanding and controlling the behavioural problems which ones faces in everyday life. both in formal and informal situations. The importance of paired friendships has been viewed as being of considerable educational importance because of the problems created by groups of twos or threes in classrooms. The importance of the study from the viewpoint of clinical psychology has been streesed in the words of Freud: "It was found that men become neurotic because they cannot tolerate the degree of privation that society imposes on them in virtue of its cultural ideals, and it was supposed that a return to greater possibilities of happiness would ensure if these standards were abolished or greatly relaxed." The importance of the study from the guidance viewpoint has also been stressed: the adolescent must make some satisfactory solution of his love life so that he can have personal friends and community altruism". We may agree with the author regarding the importance of interpersonal relations from the clinical and guidance viewpoints, but it is difficult to agree with the stated importance of this study from the school viewpoint. From the teaching-learning point of view, the academic, social and emotional growth of an individual is affected favourably or adversely by his position among his/her classfellows, and the social-emotional atmosphere of the class is very largely created and maintained by pupil interaction and their functioning. The relations of isolated pairs are not so important as that of a group of persons.

The sample selected for this study were 407 boys from 12 class-groups from boys schools and 261 girls from 8 class-groups from girls schools. On the basis of the income of their parents, they have been classified into three economic groups: (1) Low (income up to Rs. 100 p.m.), (2) Middle (income between Rs. 100 and Rs. 500 p.m.), (3) High (income above Rs. 500 p.m). In the present day this classification is hardly satisfactory. The income group with a monthly income of Rs. 100 to Rs. 500 is really a low income group or at the most a lower middle income group. Ninety-five pairs belong to groups having income up to Rs. 500 and only 5 pairs belong to income group above Rs. 500 p.m. Therefore, the sample can best be described as a low-income group or a lower-middle income group. It would not be justifiable to draw inferences for middle or higher income groups from this investigation. Another shortcoming of the study happens to be that it is limited to unisexual pairs of boys and girls; boy-girl pairs could have been obtained if good co-educational institutions had been included in the sample. Actually the study had no sampling design. A stratified sampling design according to socio-economic status of pupils and sex would have overcome these deficiencies.

The tools used in the investigation consist of: (1) a questionnaire for sociological factors; (2) an interest inventory for likes and dislikes; (3) Jalota's Group Intelligence Test for general mental ability; (4) T.A.T. for introversion-extroversion; (5) Sentence Completion Test along with TAT for sentiments and psychological needs; and (6) examination results as a measure of scholastic achievement. Of these only four—Jalota's Group Intelligence Test, TAT, Rohd's Sentence Completion Test, and the Personality and Interest Inventory by Getrude Hindreth—are standarised tools. Out of these latter two are neither standardised for Indian conditions nor used in their original forms. It would have been better to report evidence that the Hindi translation with necessary modifications did not affect their reliability and validity. Also, information about the reliability of other unstandardised tools should have been obtained and reported for a small sub-sample of the study.

The investigator has identified paired friends by using part A of the Questionnaire. The first five questions of the questionnaire are indicative of possibilities or probabilities, and not of actualities. For example, 'Whom will you study with?' and 'Whom do you study with?' make a world of difference. The latter form is more appropriate for identifying actual pairs.

The general information collected about the pairs is given in Table 3 which includes, besides other things: (a) occupation of the guardian, and (b) income of the guardian. In some cases the occupations are quite clear like lawyer, teacher, railway clerk, motor driver, but in most of the cases there are broad categories like 'Government services', 'A. G. office', 'business', which is not helpful in building up scientific knowledge. It would have been appropriate to follow the approved system of classification of occupations. Likewise the income reported is not actual. In some cases it is written as 300-400, in some it is 100, in some it is 500-or-above, etc. There is an attempt by the subjects to give round figures. Again, it would have been better to provide categories of income groups in the questionnaire and the subjects should have ticked one of these categories. Further, the data on castes is not meaningful as the subjects have mostly mentioned Hindu and Muslim as their castes neither of which is a caste.

The psychological factors studied in the investigation include the following non-cognitive factors: (i) sentiments, (ii) extroversion and introversion, (iii) psychological needs, which have been measured by T.A.T. and Sentence Completion Test. There is no listing of the sentiments and psychological needs which is more important than the statistical inference that there are similar trends in sentiments and psychological needs. These could have been listed in the appendix and would have provided scientific information about the psychological needs and sentiments of our adolescents reading in schools.

In his concluding remarks the author has divelt upon the educational implications of his study. These implications are more concerned with the development of healthy groups—class groups, the nation and the larger world society. The author has made four suggestions: first, admit students from all levels of economic, caste and language groups; second, form smaller associations and heterogeneous groups of the three characterstics mentioned above; third, prescribe a school dress; fourth, encourage pen-friendship to broaden the pupil' mind and to make them moue towards the aim of universal brotherhood. Only a passing reference has been made to the importance of personal guidance. But from the point of view of the stated need for research in the area of paired interpersonal relations one would expect more emphasis on clinical problems, personal adjustment problems of adolescents and improvement of the teaching-learning process through small groups. However, even as the study stands, the findings appear to be quite useful in these areas.

Finally, a few suggestions which may be useful when the book is reprinted. To begin with, the correlation matrix of psychological factors may be added just before the table showing factor loadings is given. Next, the graph-diagram No. 3 referred to on pages 84 and 96 of the text seems to be missing from the book; this should be added. Then again, throughout the book the term IQ has been used; this may be replaced by the expression "general mental ability scores", since no IQs appear to have been used. Finally, the appendix would be enriched if a list of the psychological and sentimental needs of adolescence is added to it.

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